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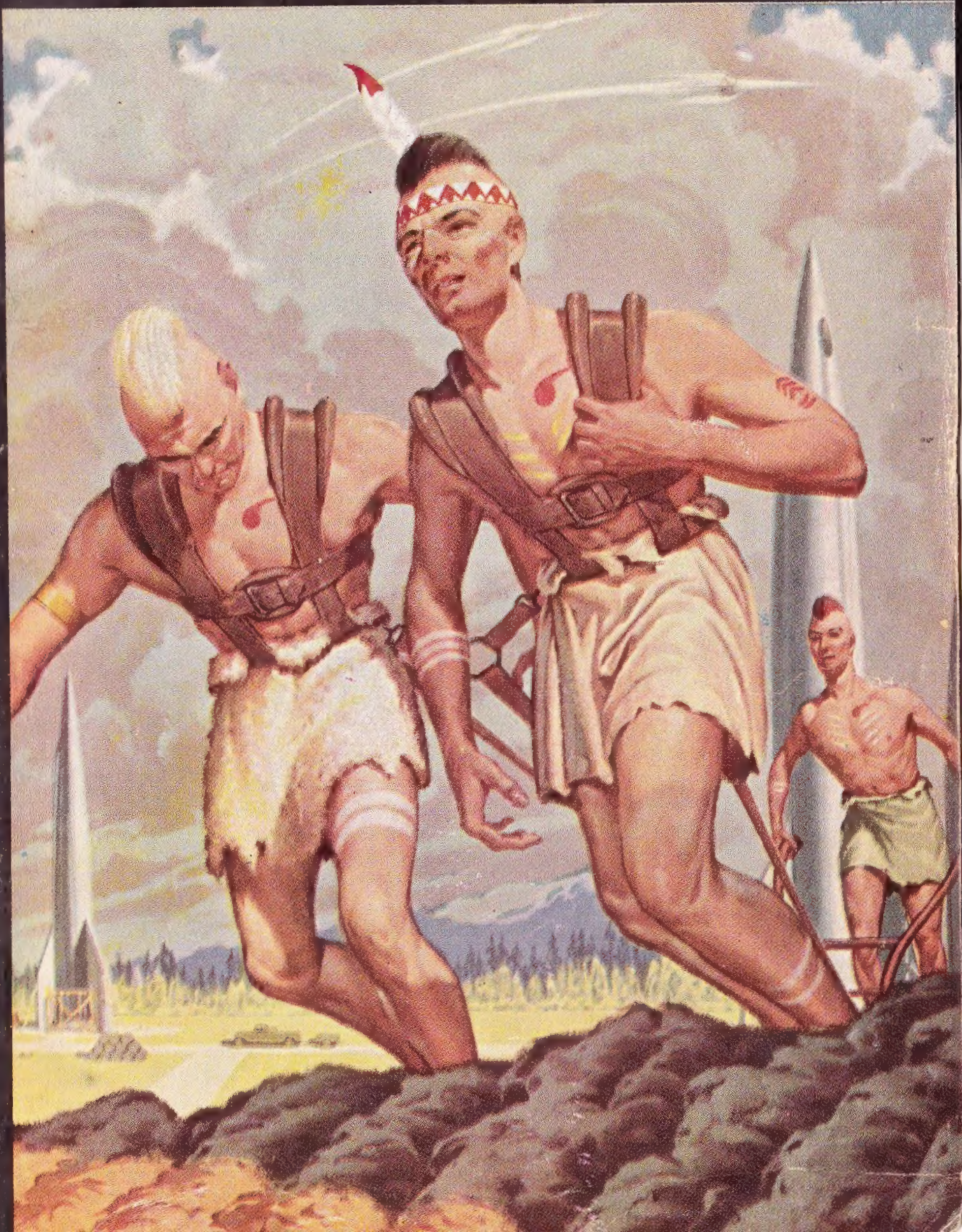
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The Specter General BY THEODORE R. COGSWELL



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UNCERTAINTY PRINCIPLE

Heisenberg, by considerable mathematical manipulation, demonstrated that a basic uncertainty existed in nature. It was shown that the *position* of an electron, *or* the *velocity* could be determined—theoretically—to any desired degree of accuracy—but not both simultaneously.

Without mathematical analysis, I wonder if one can't make a similar and meaningful statement about the future. Our business is studying the future; physical science is, basically, an effort to make accurate predictions of the future. Men live best if they can predict with reasonable accuracy the results of their acts. The effort to predict the future is older than man, surely, and no mere mystic-spiritualist-misty-eyed-dreamer business. It's the most essential business of Mankind.

It seems to me that there are, basically, two types of statements concerning the future, representing the two extremes between which all usual prediction statements fall. These

are the statement of very high truth value, and practically zero applicability value, and the statement of very low truth value, and very high applicability value. I have a hunch that some sort of mathematical relationship could be worked out that the product of truth value times applicability value for any statement of the future equaled a constant. The higher the truth, the lower the applicability.

For example, the statement: "Something will happen in the future," approaches the ultimate absolute certainty in truth-value. But its applicability value is a very good approximation of zero.

The other side of the relationship—statements of high applicability value and low truth value—are known as fiction stories. The stories in the current issue, for instance, contain an immense wealth of detail about the future; their truth value, sad to say, approaches zero.

Now it is highly interesting to consider this problem and see what escape

from this situation might be possible. How can we predict the future if all true statements have no applicability? It would then be impossible. But, while the product of truth-applicability value approaches zero, it does not equal zero—it's simply infinitesimally small.

Mathematics has a way of handling infinitesimals, however; the integration of a near-infinite number of near-infinitely-small units can equal a large, determined value—the basic principle of integral calculus. While the future can't be predicted arithmetically, then, perhaps it can be predicted on the general approach of integral calculus—the summation of an immense number of very small truth-applicability units.

Now it's evident that summing statements like "Something will happen in the future" isn't in line with this approach. People have been trying to get somewhere that way, however, for a long time. Make a generalization sufficiently broad, and it is apt to be true—but uninformative.

More recently, the other approach has been studied. Take infinitesimals consisting of highly probable truths, but of exceedingly narrow applicability value, and sum these to predict the future. That approach, as a matter of tested fact, permits accurate prediction—the accuracy being

limited only by the accuracy of measurement of our instruments!

The approach necessary to this technique is to narrow the range of application of the statement to an extremely improbable event—but improbable by reason of the narrowness and immense specificity of the terms of the prediction.

In essence, the sum of many highly improbable events yields a certainty.

This proven method of predicting the future is known as physical science.

Physical science consists of making an immense number of extremely limited statements about extremely improbable events; each of the improbable events is itself true, but actually contains information of practically zero applicability. The product of an immense number of near-zero applicability value statements, however, has high applicability.

That this is in fact the case in physical science is not immediately apparent to the modern technologist; it is still a fact. Consider this: "If metallic zinc is in 1-normal sulfuric acid, it will dissolve, releasing hydrogen and forming zinc sulfate." Any chemist will tell you that that, as a prediction, is a certainty.

Its truth-value may be high, but its probability of applicability in the Universe is about fifty places to the

right of the decimal point. Free metallic zinc doesn't occur in nature. Free sulfuric acid doesn't occur in nature. Both of these substances are extremely reactive; the probability of either occurring in a free state is infinitesimal. The probability that these two substances should occur free in the same environment at the same time is immeasurably remote. Therefore the statement that a reaction *would* occur *if* the situation existed may have high truth value, but the probability of having such a situation actually eventuate, in a free universe, makes the statement one of nearly zero applicability value.

It's somewhat like a gambler who has an ace of spades, and four completely useless cards in his hand, saying "If I take four new cards, and I draw the king, queen, jack and ten of spades, I predict I'll win the pot." He is perfectly correct; the statement has very high truth-value, but very low applicability value.

So he bets on the pot, draws four new cards, pushes the bets to the limit, and lays down a Royal Straight Flush in spades. This man is not only a gambler; he's a professional gambler,

and stacks the cards for a living.

The business of a professional gambler of that type is, like the business of the professional scientist, one of interfering with the laws of probability, so that exceedingly remote possibilities become certainties. The engineer stacks the cards against nature; he makes one extremely remote probability operate against another even more remote probability, until a certainty results.

There's an atom of zinc in South Africa, and an atom of sulfur eight hundred feet down under Louisiana. Under the laws of a free universe—with no stacking of the cards—what is the probability that these two will combine to form zinc sulfide next year, in the area of London, England?

Life forms—including Man—make a business of playing nature for a sucker; they reverse the laws of probability, invalidate statistics, and invert entropy.

And the way to predict the future—with deadly accuracy—is to integrate an immense number of high-truth statements of near-zero applicability value!

THE EDITOR.



THE SPECTER GENERAL

BY THEODORE R. COGSWELL

Normally, a colony is a fairly balanced miniature of its civilization, and acts pretty much like the civilization. But some most peculiar results can come from an isolated military base!

Illustrated by Welker

I.

"Sergeant Dixon!"

Kurt stiffened. He knew *that* voice. Dropping the handles of the wooden plow, he gave a quick "rest" to the private and a polite "by your leave, sir" to the lieutenant who were yoked together in double harness. They both sank gratefully to the ground as Kurt advanced to meet the approaching officer.

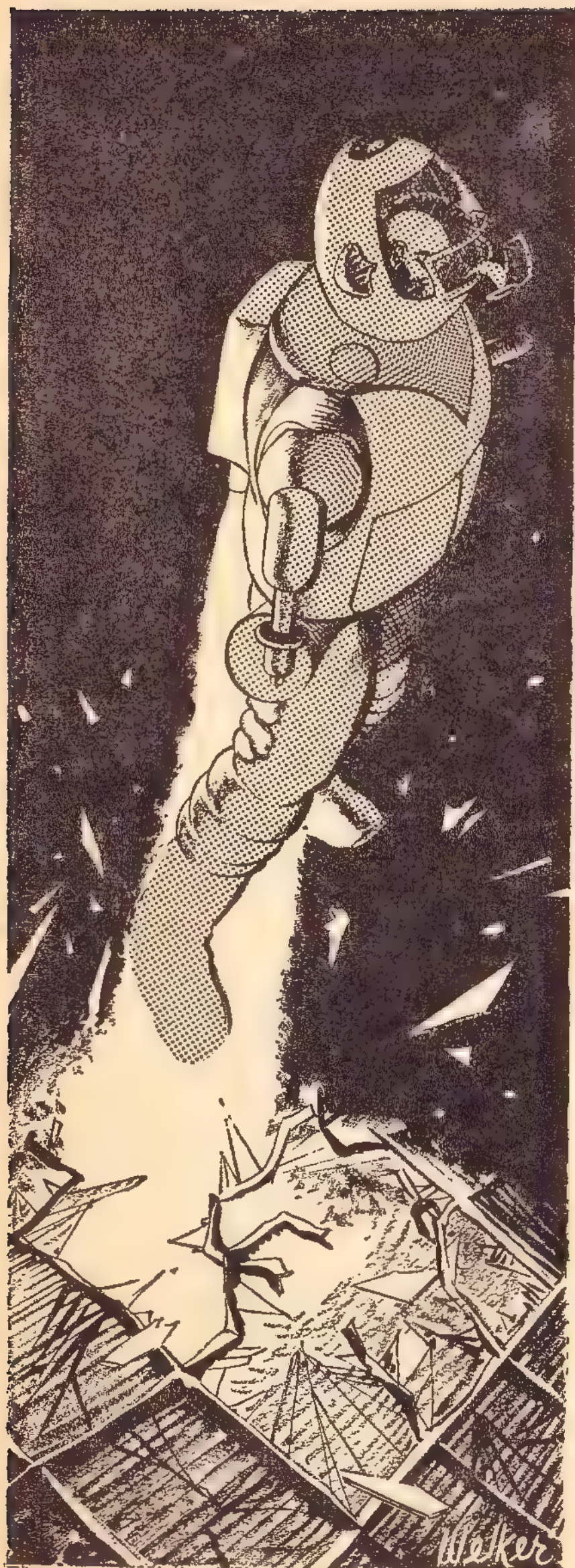
Marcus Harris, the commander of the 427th Light Maintenance Battalion of the Imperial Space Marines, was an imposing figure. The three silver eagle feathers of a full colonel rose proudly from his war bonnet and the bright red of the flaming comet insignia of the Space Marines that was painted on his chest stood out

sharply against his sun-blackened, leathery skin. As Kurt snapped to attention before him and saluted, the colonel surveyed the fresh turned earth with an experienced eye.

"You plow a straight furrow, soldier!" His voice was hard and metallic but it seemed to Kurt that there was a concealed glimmer of approval in his flinty eyes. Dixon flushed with pleasure and drew his broad shoulders back a little farther.

The commander's eyes flicked down to the battle-ax that rested snugly in its leather holster at Kurt's side. "You keep a clean sidearm, too."

Kurt uttered a silent prayer of thanksgiving that he had worked over his weapon before reveille that morning until there was a satin gloss to its redwood handle and the sheen of



black glass to its obsidian head.

"In fact," said Colonel Harris, "you'd be officer material if—" His voice trailed off.

"If what?" asked Kurt eagerly.

"If," said the colonel with a note of paternal fondness in his voice that sent cold chills dancing down Kurt's spine, "you weren't the most completely unmanageable, undisciplined, over-muscled and under-brained knucklehead I've ever had the misfortune to have in my command. This last little unauthorized jaunt of yours indicates to me that you have as much right to sergeant's stripes as I have to have kittens. Report to me at ten tomorrow! I personally guarantee that when I'm through with you—if you live that long—you'll have a bare forehead!"

Colonel Harris spun on one heel and stalked back across the dusty plateau toward the walled garrison that stood at one end. Kurt stared after him for a moment and then turned and let his eyes slip across the wide belt of lush green jungle that surrounded the high plateau. To the north rose a great range of snow-capped mountains and his heart filled with longing as he thought of the strange and beautiful thing he had found behind them. Finally he plodded slowly back to the plow, his shoulders stooped and his head sagging. With an effort he recalled himself to the business at hand.

"Up on your dying feet, soldier!" he barked to the reclining private.

"If you please, sir!" he said to the lieutenant. His calloused hands grasped the worn plow handles.

"Giddiup!" The two men strained against their collars and with a creak of harness the wooden plow started to move slowly across the arid plateau.

II.

Conrad Krogson, Supreme Commander of War Base Three of Sector Seven of the Galactic Protectorate stood at quaking attention before the visiscreen of his space communicator. It was an unusual position for the commander. He was accustomed to having people quake while *he* talked.

"The Lord Protector's got another hot tip that General Carr is still alive!" said the sector commander. "He's yelling for blood; and if it's a choice between yours and mine, you know who will do the donating!"

"But, sir," quavered Krogson to the figure on the screen, "I can't do anything more than I am doing. I've had double security checks running since the last time there was an alert, and they haven't turned up a thing. And I'm so short-handed now that if I pull another random purge, I won't have enough techs left to work the base."

"That's your problem, not mine," said the sector commander coldly. "All that I know is that rumors have got to the Protector that an organized underground is being built up and that

Carr is behind it. The Protector wants action now. If he doesn't get it, heads are going to roll!"

"I'll do what I can, sir," promised Krogson.

"I'm sure you will," said the sector commander viciously, "because I'm giving you exactly ten days to produce something that is big enough to take the heat off me. If you don't, I'll break you, Krogson. If I'm sent to the mines, you'll be sweating right alongside me. That's a promise!"

Krogson's face blanched.

"Any questions?" snapped the sector commander.

"Yes," said Krogson.

"Well don't bother me with them. I've got troubles of my own!" The screen went dark.

Krogson slumped into his chair and sat staring dully at the blank screen. Finally he roused himself with an effort and let out a bellow that rattled the windows of his dusty office.

"Schninkle! Get in here!"

A gnomelike little figure scuttled in through the door and bobbed obsequiously before him.

"Yes, commander?"

"Switch on your thinktank," said Krogson. "The Lord Protector has the shakes again and the heat's on!"

"What is it this time?" asked Schninkle.

"General Carr!" said the commander gloomily, "the ex-Number Two."

"I thought he'd been liquidated."

"So did I," said Krogson, "but he must have slipped out some way. The Protector thinks he's started up an underground."

"He'd be a fool if he didn't," said the little man. "The Lord Protector isn't as young as he once was and his grip is getting a little shaky."

"Maybe so, but he's still strong enough to get us before General Carr gets him. The Sector Commander just passed the buck down to me. We produce or else!"

"We?" said Schninkle unhappily.

"Of course," snapped Krogson, "we're in this together. Now let's get to work! If you were Carr, where would be the logical place for you to hide out?"

"Well," said Schninkle thoughtfully, "if I were as smart as Carr is supposed to be, I'd find myself a hideout right on Prime Base. Everything's so fouled up there that they'd never find me."

"That's out for us," said Krogson. "We can't go rooting around in the Lord Protector's own backyard. What would Carr's next best bet be?"

Schninkle thought for a moment. "He might go out to one of the deserted systems," he said slowly. "There must be half a hundred stars in our own base area that haven't been visited since the old empire broke up. Our ships don't get around the way they used to and the chances are mighty slim that anybody would

stumble on to him accidentally."

"It's a possibility," said the commander thoughtfully, "a bare possibility." His right fist slapped into his left palm in a gesture of sudden resolution. "But by the Planets! at least it's something! Alert all section heads for a staff meeting in half an hour. I want every scout out on a quick check of every system in our area!"

"Beg pardon, commander," said Schninkle, "but half our light ships are red-lined for essential maintenance and the other half should be. Anyway it would take months to check every possible hideout in this area even if we used the whole fleet."

"I know," said Krogson, "but we'll have to do what we can with what we have. At least I'll be able to report to sector that we're doing *something*! Tell Astrogation to set up a series of search patterns. We won't have to check every planet. A single quick sweep through each system will do the trick. Even Carr can't run a base without power. Where there's power, there's radiation, and radiation can be detected a long way off. Put all electronic techs on double shifts and have all detection gear double-checked."

"Can't do that either," said Schninkle. "There aren't more than a dozen electronic techs left. Most of them were transferred to Prime Base last week."

Commander Krogson blew up. "How in the name of the Bloody Blue Ple-

iades am I supposed to keep a war base " going without technicians? You tell me, Schninkle, you always seem to know all the answers."

Schninkle coughed modestly. "Well, sir," he said, "as long as you have a situation where technicians are sent to the uranium mines for making mistakes, it's going to be an unpopular vocation. And, as long as the Lord Protector of the moment is afraid that Number Two, Number Three, and so on have ideas about grabbing his job—which they generally do—he's going to keep his fleet as strong as possible and their fleets so weak they aren't dangerous. The best way to do that is to grab techs. If most of a base's ships are sitting around waiting repair, the commander won't be able to do much about any ambitions he may happen to have. Add that to the obvious fact that our whole technology has been on a downward spiral for the last three hundred years and you have your answer."

Krogson nodded gloomy agreement. "Sometimes I feel as if we were all on a dead ship falling into a dying sun," he said with rare candor. His voice suddenly altered. "But in the meantime we have our necks to save. Get going, Schninkle!"

Schninkle bobbed and darted out of the office.

III.

It was exactly ten o'clock in the

morning when Sergeant Dixon of the Imperial Space Marines snapped to attention before his commanding officer.

"Sergeant Dixon reporting as ordered, sir!" His voice cracked a bit in spite of his best efforts to control it.

The colonel looked at him coldly. "Nice of you to drop in, Dixon," he said. "Shall we go ahead with our little chat?"

Kurt nodded nervously.

"I have here," said the colonel, shuffling a sheaf of papers, "a report of an unauthorized expedition made by you into *Off Limits* territory."

"Which one do you mean, sir?" asked Kurt without thinking.

"Then there has been more than one?" asked the colonel quietly.

Kurt started to stammer.

Colonel Harris silenced him with a gesture of his hand. "I'm talking about the country to the north, the tableland back of the Twin Peaks."

"It's a beautiful place!" burst out Kurt enthusiastically. "It's . . . it's like Imperial Headquarters must be. Dozens of little streams full of fish, trees heavy with fruit, small game so slow and stupid that they can be knocked over with a club. Why, the battalion could live there without hardly lifting a finger!"

"I've no doubt that they could," said the colonel.

"Think of it, sir!" continued the sergeant. "No more plowing details, no more hunting details, no more

nothing but taking it easy!"

"You might add to your list of 'no more,' no more tech schools," said Colonel Harris. "I'm quite aware that the place is all you say it is, sergeant. As a result I'm placing all information that pertains to it in a 'Top Secret' category. That applies to what is inside your head as well!"

"But, sir!" protested Kurt. "If you could only see the place—"

"I have," broke in the colonel, "thirty years ago."

Kurt looked at him in amazement. "Then why are we still on the plateau?"

"Because my commanding officer did just what I've just done, classified the information 'Top Secret.' Then he gave me thirty days extra detail on the plows. After he took my stripes away that is." Colonel Harris rose slowly to his feet. "Dixon," he said softly, "it's not every man who can be a noncommissioned officer in the Space Marines. Sometimes we guess wrong. When we do we do something about it!" There was the hissing crackle of distant summer lightning in his voice and storm clouds seemed to gather about his head. "Wipe those chevrons off!" he roared.

Kurt looked at him in mute protest.

"You heard me!" the colonel thundered.

"Yes-s-s, sir," stuttered Kurt, reluctantly drawing his forearm across his forehead and wiping off the three triangles of white grease paint that

marked him a sergeant in the Imperial Space Marines. Quivering with shame, he took a tight grip on his temper and choked back the angry protests that were trying to force their way past his lips.

"Maybe," suggested the colonel, "you'd like to make a complaint to the I.G. He's due in a few days and he might reverse my decision. It has happened before, you know."

"No, sir," said Kurt woodenly.

"Why not?" demanded Harris.

"When I was sent out as a scout for the hunting parties I was given direct orders not to range farther than twenty kilometers to the north. I went sixty." Suddenly his forced composure broke. "I couldn't help it, sir," he said. "There was something behind those peaks that kept pulling me and pulling me and"—he threw up his hands—"you know the rest."

There was a sudden change in the colonel's face as a warm human smile swept across it, and he broke into a peal of laughter. "It's a hell of a feeling, isn't it, son? You know you shouldn't, but at the same time there's something inside you that says you've got to know what's behind those peaks or die. When you get a few more years under your belt you'll find that it isn't just mountains that make you feel like that. Here, boy, have a seat." He gestured toward a woven wicker chair that stood by his desk.

Kurt shifted uneasily from one foot to the other, stunned by the colonel's

sudden change of attitude and embarrassed by his request. "Excuse me, sir," he said, "but we aren't out on work detail, and—"

The colonel laughed. "And enlisted men not on work detail don't sit in the presence of officers. Doesn't the way we do things ever strike you as odd, Dixon? On one hand you'd see nothing strange about being yoked to a plow with a major, and on the other you'd never dream of sitting in his presence off duty."

Kurt look puzzled. "Work details are different," he said. "We all have to work if we're going to eat. But in the garrison, officers are officers and enlisted men are enlisted men and that's the way it's always been."

Still smiling, the colonel reached into his desk drawer, fished out something, and tossed it to Kurt.

"Stick this in your scalp lock," he said.

Kurt looked at it, stunned. It was a golden feather crossed with a single black bar, the insignia of rank of a second lieutenant of the Imperial Space Marines. The room swirled before his eyes.

"Now," said the older officer, "sit down!"

Kurt slowly lowered himself into the chair and looked at the colonel through bemused eyes.

"Stop gawking!" said Colonel Harris. "You're an officer now! When a man gets too big for his sandals, we

give him a new pair—after we let him sweat a while!"

He suddenly grew serious. "Now that you're one of the family you have a right to know why I'm hushing up the matter of the tableland to the north. What I have to say won't make much sense at first. Later I'm hoping it will. Tell me," he said suddenly, "where did the battalion come from?"

"We've always been here I guess," said Kurt. "When I was a recruit, Granddad used to tell me stories about us being brought from some place else a long time ago by an iron bird, but it stands to reason that something that heavy can't fly!"

A faraway look came into the colonel's eyes. "Six generations," he mused, "and history becomes legend. Another six and the legends themselves become tales for children. Yes, Kurt," he said softly, "it stands to reason that something that heavy couldn't fly so we'll forget it for a while. We did come from some place else though. Once there was a great empire, so great that all the stars you see at night were only part of it. And then, as things do when age rests too heavily on them, it began to crumble. Commanders fell to fighting among themselves and the Emperor grew weak. The battalion was set down here to operate a forward maintenance station for his ships. We waited but no ships came. For five hundred years no ships have come," said the colonel somberly. "Perhaps they tried to

relieve us and couldn't, perhaps the Empire fell with such a crash that we were lost in the wreckage. There are a thousand perhapses that a man can tick off in his mind when the nights are long and sleep comes hard! Lost . . . forgotten . . . who knows?"

Kurt stared at him with a blank expression on his face. Most of what the colonel had said made no sense at all. Wherever Imperial Headquarters was, it hadn't forgotten them. The I.G. still made his inspection every year or so.

The colonel continued as if talking to himself. "But our operational orders said that we would stand by to give all necessary maintenance to Imperial warcraft until properly relieved, and stand by we have."

The old officer's voice seemed to be coming from a place far distant in time and space.

"I'm sorry, sir," said Kurt, "but I don't follow you. If all these things did happen, it was so long ago that they mean nothing to us now."

"But they do!" said Colonel Harris vigorously. "It's because of them that things like your rediscovery of the tableland to the north have to be suppressed for the good of the battalion! Here on the plateau the living is hard. Our work in the fields and the meat brought in by our hunting parties give us just enough to get by on. But here we have the garrison and the Tech Schools—and vague as it has

become—a reason for remaining together as the battalion. Out there where the living is easy we'd lose that. We almost did once. A wise commander stopped it before it went too far. There are still a few signs of that time left—left deliberately as reminders of what can happen if commanding officers forget why we're here!"

"What things?" asked Kurt curiously.

"Well, son," said the colonel, picking up his great war bonnet from the desk and gazing at it quizzically, "I don't think you're quite ready for that information yet. Now take off and strut your feather. I've got work to do!"

IV.

At War Base Three nobody was happy. Ships that were supposed to be light-months away carrying on the carefully planned search for General Carr's hideout were fluttering down out of the sky like senile penguins, disabled by blown jets, jammed computers, and all the other natural ills that worn out and poorly serviced equipment is heir to. Technical maintenance was quietly going mad. Commander Krogson was being noisy about it.

"Schninkle!" he screamed. "Isn't anything happening any place?"

"Nothing yet, sir," said the little man.

"Well *make* something happen!"



He hoisted his battered brogans onto the scarred top of the desk and chewed savagely on a frayed cigar. "How are the other sectors doing?"

"No better than we are," said Schninkle. "Commander Snork of Sector Six tried to pull a fast one but he didn't get away with it. He sent his STAP into a plantation planet out at the edge of the Belt and had them hypno the whole population. By the time they were through there were

about fifteen million greenies running around yelling 'Up with General Carr!' 'Down with the Lord Protector!' 'Long Live the People's Revolution!' and things like that. Snork even gave them a few medium vortex blasters to make it look more realistic. Then he sent in his whole fleet, tipped off the press at Prime Base, and waited. Guess what the Bureau of Essential Information finally sent him?"

"I'll bite," said Commander Krog-

son.

"One lousy cub reporter. Snork couldn't back out then so he had to go ahead and blast the planet down to bedrock. This morning he got a three-line notice in *Space* and a citation as Third Rate Protector of the People's Space Ways, Eighth Grade."

"That's better than the nothing we've got so far!" said the commander gloomily.

"Not when the press notice is buried on the next to last page right below the column on 'Our Feathered Comrades'," said Schninkle, "and when the citation is posthumous. They even misspelled his name; it came out Snark!"

V.

As Kurt turned to go, there was a sharp knock on Colonel Harris' door.

"Come in!" called the colonel.

Lieutenant Colonel Blick, the battalion executive officer, entered with an arrogant stride and threw his commander a slovenly salute. For a moment he didn't notice Kurt standing at attention beside the door.

"Listen, Harris!" he snarled. "What's the idea of pulling that clean-up detail out of my quarters?"

"There are no servants in this battalion, Blick," the older man said quietly. "When the men come in from work detail at night they're tired. They've earned a rest and as long as I'm C.O. they're going to get it. If

you have dirty work that has to be done, do it yourself. You're better able to do it than some poor devil who's been dragging a plow all day. I suggest you check pertinent regulations!"

"Regulations!" growled Blick. "What do you expect me to do, scrub my own floors?"

"I do," said the colonel dryly, "when my wife is too busy to get to it. I haven't noticed that either my dignity or my efficiency have suffered appreciably. I might add," he continued mildly, "that staff officers are supposed to set a good example for their juniors. I don't think either your tone or your manner are those that Lieutenant Dixon should be encouraged to emulate." He gestured toward Kurt and Blick spun on one heel.

"*Lieutenant* Dixon!" he roared in an incredulous voice. "By whose authority?"

"Mine," said the colonel mildly. "In case you've forgotten I am still commanding officer of this battalion."

"I protest!" said Blick. "Commissions have always been awarded by decision of the entire staff."

"Which you now control," replied the colonel.

Kurt coughed nervously. "Excuse me, sir," he said, "but I think I'd better leave."

Colonel Harris shook his head. "You're one of our official family now, son, and you might as well get used to our squabbles. This particular

one has been going on between Colonel Blick and me for years. He has no patience with some of our old customs." He turned to Blick. "Have you, colonel?"

"You're right, I haven't!" growled Blick. "And that's why I'm going to change some of them as soon as I get the chance. The sooner we stop this Tech School nonsense and put the recruits to work in the fields where they belong, the better off we'll all be. Why should a plowman or a hunter have to know how to read wiring diagrams or set tubes. It's nonsense, superstitious nonsense. You!" he said, stabbing his finger into the chest of the startled lieutenant. "You! Dixon! You spent fourteen years in the Tech Schools just like I did when I was a recruit. What for?"

"To learn maintenance, of course," said Kurt.

"What's maintenance?" demanded Blick.

"Taking stuff apart and putting it back together and polishing jet bores with microplanes and putting plates in alignment and checking the meters when we're through to see the job was done right. Then there's class work in Direc calculus and subelectronics and—"

"That's enough!" interrupted Blick. "And now that you've learned all that, what can you do with it?"

Kurt looked at him in surprise. "Do with it?" he echoed. "You don't *do* anything with it. You just learn it

because regulations say you should."

"And this," said Blick, turning to Colonel Harris, "is one of your prize products. Fourteen of his best years poured down the drain and he doesn't even know what for!" He paused and then said in an arrogant voice, "I'm here for a showdown, Harris!"

"Yes?" said the colonel mildly.

"I demand that the Tech Schools be closed at once and the recruits released for work details. If you want to keep your command, you'll issue that order. The staff is behind me on this!"

Colonel Harris rose slowly to his feet. Kurt waited for the thunder to roll, but strangely enough it didn't. It almost seemed to him that there was an expression of concealed amusement playing across the colonel's face.

"Some day, just for once," he said, "I wish somebody around here would do something that hasn't been done before."

"What do you mean by that?" demanded Blick.

"Nothing," said the colonel. "You know," he continued conversationally, "a long time ago I walked into my C.O.'s and made the same demands and the same threats that you're making now. I didn't get very far, though—just as you aren't going to—because I overlooked the little matter of the Inspector General's annual visit. He's due in from Imperial Headquarters Saturday night, isn't he Blick?"

"You know he is!" growled the

other.

"Aren't worried, are you? It occurs to me that the I.G. might take a dim view of your new order."

"I don't think he'll mind," said Blick with a nasty grin. "Now will you issue the order to close the Tech Schools or won't you?"

"Of course not!" said the colonel brusquely.

"That's final?"

Colonel Harris just nodded.

"All right," barked Blick, "you asked for it!"

There was an ugly look on his face as he barked, "Kane! Simmons! Arnett! The rest of you! Get in here!"

The door to Harris' office swung slowly open and revealed a group of officers standing sheepishly in the anteroom.

"Come in, gentlemen," said Colonel Harris.

They came slowly forward and grouped themselves just inside the door.

"I'm taking over!" roared Blick. "This garrison has needed a house cleaning for a long time and I'm just the man to do it!"

"How about the rest of you?" asked the colonel.

"Beg pardon, sir," said one hesitantly, "but we think Colonel Blick's probably right. I'm afraid we're going to have to confine you for a few days. Just until after the I.G.'s visit," he added apologetically.

"And what do you think the I.G. will say to all this?"

"Colonel Blick says we don't have to worry about that," said the officer. "He's going to take care of everything."

A look of sudden anxiety played across Harris' face and for the first time he seemed on the verge of losing his composure.

"How?" he demanded, his voice betraying his concern.

"He didn't say, sir," the other replied. Harris relaxed visibly.

"All right," said Blick. "Let's get moving!" He walked behind the desk and plumped into the colonel's chair. Hoisting his feet on the desk he gave his first command.

"Take him away!"

There was a sudden roar from the far corner of the room. "No you don't!" shouted Kurt. His battle-ax leaped into his hand as he jumped in front of Colonel Harris, his muscular body taut and his gray eyes flashing defiance.

Blick jumped to his feet. "Disarm that man!" he commanded. There was a certain amount of scuffling as the officers in the front of the group by the door tried to move to the rear and those behind them resolutely defended their more protected positions.

Blick's face grew so purple that he seemed on the verge of apoplexy. "Major Kane," he demanded, "place that man under restraint!"

Kane advanced toward Kurt with a

noticeable lack of enthusiasm. Keeping a cautious eye on the glittering ax head, he said in what he obviously hoped to be a placating voice, "Come now, old man. Can't have this sort of thing, you know." He stretched out his hand hesitantly toward Kurt. "Why don't you give me your ax and we'll forget that the incident ever occurred."

Kurt's ax suddenly leaped toward the major's head. Kane stood petrified as death whizzed toward him. At the last split second Kurt gave a practiced twist to his wrist and the ax jumped up, cutting the air over the major's head with a vicious whistle. The top half of his silver staff plume drifted slowly to the floor.

"You want it," roared Kurt, his ax flicking back and forth like a snake's tongue, "you come get it. That goes for the rest of you, too!"

The little knot of officers retreated still farther. Colonel Harris was having the time of his life.

"Give it to 'em, son!" he whooped.

Blick looked contemptuously at the staff and slowly drew his own ax. Colonel Harris suddenly stopped laughing.

"Wait a minute, Blick!" he said. "This has gone far enough." He turned to Kurt.

"Give them your ax, son."

Kurt looked at him with an expression of hurt bewilderment in his eyes, hesitated for a moment, and then glumly surrendered his weapon to the

relieved major.

"Now," snarled Blick, "take that insolent puppy out and feed him to the lizards!"

Kurt drew himself up in injured dignity. "That is no way to refer to a brother officer," he said reproachfully.

The vein in Blick's forehead started to pulse again. "Get him out of here before I tear him to shreds!" he hissed through clenched teeth. There was silence for a moment as he fought to regain control of himself. Finally he succeeded.

"Lock him up!" he said in an approximation to his normal voice. "Tell the provost sergeant I'll send down the charges as soon as I can think up enough."

Kurt was led resentfully from the room.

"The rest of you clear out," said Blick. "I want to talk with Colonel Harris about the I.G."

VI.

There was a saying in the Protectorate that when the Lord Protector was angry, stars and heads fell. Commander Krogson felt his wobble on his neck. His far-sweeping scouts were sending back nothing but reports of equipment failure, and the sector commander had coldly informed him that morning that his name rested securely at the bottom of the achievement list. It looked as if War Base Three would shortly have a change of command.

"Look, Schninkle," he said desperately, "even if we can't give them anything, couldn't we make a promise that would look good enough to take some of the heat off us?"

Schninkle looked dubious.

"Maybe a new five-year plan?" suggested Krogson.

The little man shook his head. "That's a subject we'd better avoid entirely," he said. "They're still asking nasty questions about what happened to the last one. Mainly on the matter of our transport quota. I took the liberty of passing the buck on down to Logistics. Several of them have been . . . eh . . . removed as a consequence."

"Serves them right!" snorted Krogson. "They got me into that mess with their 'if a freighter and a half flies a light-year and a half in a month and a half, ten freighters can fly ten light-years in ten months!' I knew there was something fishy about it at the time but I couldn't put my finger on it."

"It's always darkest before the storm," said Schninkle helpfully.

VII.

"Take off your war bonnet and make yourself comfortable," said Colonel Harris hospitably.

Blick grunted assent. "This thing is sort of heavy," he said. "I think I'll change uniform regulations while I'm at it."

"There was something you wanted to tell me?" suggested the colonel.

"Yeah," said Blick. "I figure that you figure the I.G.'s going to bail you out of this. Right?"

"I wouldn't be surprised."

"I would," said Blick. "I was up snoopin' around the armory last week. There was something there that started me doing some heavy thinking. Do you know what it was?"

"I can guess," said the colonel.

"As I looked at it it suddenly occurred to me what a happy coincidence it is that the Inspector General always arrives just when you happen to need him."

"It is odd, come to think of it."

"Something else occurred to me, too. I got to thinking that if I were C.O. and I wanted to keep the troops whipped into line, the easiest way to do it would be to have a visible symbol of Imperial Headquarters appear in person once in a while."

"That makes sense," admitted Harris, "especially since the chaplain has started preaching that Imperial Headquarters is where good marines go when they die—if they follow regulations while they're alive. But how would you manage it?"

"Just the way you did. I'd take one of the old battle suits, wait until it was good and dark, and then slip out the back way and climb up six or seven thousand feet. Then I'd switch on my landing lights and drift slowly down to the parade field to review the

troops." Blick grinned triumphantly.

"It might work," admitted Colonel Harris, "but I was under the impression that those rigs were so heavy that a man couldn't even walk in one, let alone fly."

Blick grinned triumphantly. "Not if the suit was powered. If a man were to go up into the tower of the arsenal and pick the lock of the little door labeled 'Danger! Absolutely No Admittance,' he might find a whole stack of shiny little cubes that look suspiciously like the illustrations of power packs in the tech manuals."

"That he might," agreed the colonel.

Blick shifted back in his chair. "Aren't worried, are you?"

Colonel Harris shook his head. "I was for a moment when I thought you'd told the rest of the staff, but I'm not now."

"You should be! When the I.G. arrives this time I'm going to be inside that suit. There's going to be a new order around here and he's just what I need to put the stamp of approval on it. When the Inspector General talks, nobody questions!"

He looked at Harris expectantly, waiting for a look of consternation to sweep across his face. The colonel just laughed.

"Blick," he said, "you're in for a big surprise!"

"What do you mean?" said the other suspiciously.

"Simply that I know you better

than you know yourself. You wouldn't be executive officer if I didn't. You know, Blick, I've got a hunch that the battalion is going to change the man more than the man is going to change the battalion. And now if you'll excuse me—" He started toward the door. Blick moved to intercept him.

"Don't trouble yourself," chuckled the colonel, "I can find my own way to the cell block." There was a broad grin on his face. "Besides, you've got work to do."

There was a look of bewilderment in Blick's face as the erect figure went out the door. "I don't get it," he said to himself. "I just don't get it!"

VIII.

Flight Officer Ozaki was unhappy. Trouble had started two hours after he lifted his battered scout off War Base Three and showed no signs of letting up. He sat glumly at his controls and enumerated his woes. First there was the matter of the air conditioner which had acquired an odd little hum and discharged into the cabin oxygen redolent with the rich ripe odor of rotting fish. Secondly, something had happened in the complex insides of his food synthesizer and no matter what buttons he punched, all that emerged from the ejector were quivering slabs of undercooked protein base smeared with a raspberry flavored goo.

Not last, but worst of all, the ship's

fuel converter was rapidly becoming more erratic. Instead of a slow, steady feeding of the plutonite ribbon into the combustion chamber, there were moments when the mechanism would falter and then leap ahead. The resulting sudden injection of several square millimicrons of tape would send a sudden tremendous flare of energy spouting out through the rear jets. The pulse only lasted for a fraction of a second but the sudden application of several G's meant a momentary blackout and, unless he was strapped carefully into the pilot seat, several new bruises to add to the old.

What made Ozaki the unhappiest was that there was nothing he could do about it. Pilots who wanted to stay alive just didn't tinker with the mechanism of their ships.

Glumly he pulled out another red-bordered IMMEDIATE MAINTENANCE card from the rack and began to fill it in.

Description of item requiring maintenance: "Shower thermostat, M7, Small Standard."

Nature of malfunction: "Shower will deliver only boiling water."

Justification for immediate maintenance: Slowly in large block letters Ozaki bitterly inked in "Haven't had a bath since I left base!" and tossed the card into the already overflowing gripe box with a feeling of helpless anger.

"Kitchen mechanics," he muttered. "Couldn't do a decent repair job if

they wanted to—and most of the time they don't. I'd like to see one of them three days out on a scout sweep with a toilet that won't flush!"

IX.

It was a roomy cell as cells go but Kurt wasn't happy there. His continual striding up and down was making Colonel Harris nervous.

"Relax, son," he said gently, "you'll just wear yourself out."

Kurt turned to face the colonel who was stretched out comfortably on his cot. "Sir," he said in a conspiratorial whisper, "we've got to break out of here."

"What for?" asked Harris. "This is the first decent rest I've had in years."

"You aren't going to let Blick get away with this?" demanded Kurt in a shocked voice.

"Why not?" said the colonel. "He's the exec, isn't he? If something happened to me, he'd have to take over command anyway. He's just going through the impatient stage, that's all. A few days behind my desk will settle him down. In two weeks he'll be so sick of the job he'll be down on his knees begging me to take over again."

Kurt decided to try a new tack. "But, sir, he's going to shut down the Tech Schools!"

"A little vacation won't hurt the kids," said the colonel indulgently.

"After a week or so the wives will get so sick of having them underfoot all day that they'll turn the heat on him. Blick has six kids himself and I've a hunch his wife won't be any happier than the rest. She's a very determined woman, Kurt; a very determined woman!"

Kurt had a feeling he was getting no place rapidly. "Please, sir," he said earnestly, "I've got a plan."

"Yes?"

"Just before the guard makes his evening check-in, stretch out on the bed and start moaning. I'll yell that you're dying and when he comes in to check I'll jump him!"

"You'll do no such thing!" said the colonel sternly. "Sergeant Wetzel is an old friend of mine. Can't you get it through your thick head that I don't want to escape. When you've held command as long as I have you'll welcome a chance for a little peace and quiet. I know Blick inside out and I'm not worried about him. But, if you've got your heart set on escaping, I suppose there's no particular reason why you shouldn't. Do it the easy way though. Like this." He walked to the bars that fronted the cell and belled, "Sergeant Wetzel! Sergeant Wetzel!"

"Coming, sir!" called a voice from down the corridor. There was a shuffle of running feet and a gray scalp-locked and extremely portly sergeant puffed into view.

"What will it be, sir?" he asked.

"Colonel Blick or any of the staff around?" questioned the colonel.

"No, sir," said the sergeant. "They're all upstairs celebrating."

"Good!" said Harris. "Unlock the door, will you?"

"Anything you say, colonel," said the old man agreeably and produced a large key from his pouch and fitted it into the lock. There was a slight creaking and the door swung open.

"Young Dixon here wants to escape," said the colonel.

"It's all right by me," replied the sergeant, "though it's going to be awkward when Colonel Blick asks what happened to him."

"The lieutenant has a plan," confided the colonel. "He's going to overpower you and escape."

"There's more to it than just that!" said Kurt. "I'm figuring on swapping uniforms with you. That way I can walk right out through the front gate without anybody being the wiser."

"That," said the sergeant, slowly looking down at his sixty-three inch waist, "will take a heap of doing. You're welcome to try though."

"Let's get on with it then," said Kurt, winding up a round-house swing.

"If it's all the same with you, lieutenant," said the old sergeant, eyeing Kurt's rocklike fist nervously, "I'd rather have the colonel do any overpowering that's got to be done."

Colonel Harris grinned and walked over to Wetzel.

"Ready?"

"Ready!"

Harris' fist traveled a bare five inches and tapped Wetzel lightly on the chin.

"Oof!" grunted the sergeant co-operatively and staggered back to a point where he could collapse on the softest of the two cots.

The exchange of clothes was quickly effected. Except for the pants—which persisted in dropping down to Kurt's ankles—and the war bonnet—which with equal persistence kept sliding down over his ears—he was ready to go. The pants problem was solved easily by stuffing a pillow inside them. This Kurt fondly believed made him look more like the rotund sergeant than ever. The garrison bonnet presented a more difficult problem but he finally achieved a partial solution. By holding it up with his left hand and keeping the palm tightly pressed against his forehead, it should appear to the casual observer that he was walking engrossed in deep thought.

The first two hundred yards were easy. The corridor was deserted and he plodded confidently along, the great war bonnet wabbling sedately on his head in spite of his best efforts to keep it steady. When he finally reached the exit gate, he knocked on it firmly and called to the duty sergeant.

"Open up! It's Wetzel."

Unfortunately, just then he grew careless and let go of his headgear.

As the door swung open, the great war bonnet swooped down over his ears and came to rest on his shoulders. The result was that where his head normally was there could be seen only a nest of weaving feathers. The duty sergeant's jaw suddenly dropped as he got a good look at the strange figure that stood in the darkened corridor. And then with remarkable presence of mind he slammed the door shut in Kurt's face and clicked the bolt.

"Sergeant of the guard!" he bawled. "Sergeant of the guard! There's a *thing* in the corridor!"

"What kind of a thing?" inquired a sleepy voice from the guard room.

"A horrible kind of a thing with wiggling feathers where its head ought to be," replied the sergeant.

"Get it's name, rank, and serial number," said the sleepy voice.

Kurt didn't wait to hear any more. Disentangling himself from the head-dress with some difficulty, he hurled it aside and pelted back down the corridor.

Lieutenant Dixon wandered back into the cell with a crestfallen look on his face. Colonel Harris and the old sergeant were so deeply engrossed in a game of "rockets high" that they didn't even see him at first. Kurt coughed and the colonel looked up.

"Change your mind?"

"No, sir," said Kurt. "Something slipped."

"What?" asked the colonel.

"Sergeant Wetzel's war bonnet. I'd rather not talk about it." He sank down on his bunk and buried his head in his hands.

"Excuse me," said the sergeant apologetically, "but if the lieutenant's through with my pants I'd like to have them back. There's a draft in here!"

Kurt silently exchanged clothes and then moodily walked over to the grille that barred the window and stood looking out.

"Why not go upstairs to officers' country and out that way?" suggested the sergeant, who hated the idea of being overpowered for nothing. "If you can get to the front gate without one of the staff spotting you, you can walk right out. The sentry never notices faces, he just checks for insignia."

Kurt grabbed Sergeant Wetzel's plump hand and wrung it warmly. "I don't know how to thank you," he stammered.

"Then it's about time you learned," said the colonel. "The usual practice in civilized battalions is to say 'Thank you'."

"Thank you!" said Kurt.

"Quite all right," said the sergeant. "Take the first stairway to your left. When you get to the top, turn left again and the corridor will take you straight to the exit."

Kurt got safely to the top of the

stairs and turned right. Three hundred feet later the corridor ended in a blank wall. A small passageway angled off to the left and he set off down it. It also came to a dead end in a small anteroom whose farther wall was occupied by a set of great bronze doors. He turned and started to retrace his steps. He had almost reached the main corridor when he heard angry voices sounding from it. He peeked cautiously around the corridor. His escape route was blocked by two officers engaged in acrimonious argument. Neither was too sober and the captain obviously wasn't giving the major the respect that a field officer usually commanded.

"I don't care what she said!" the captain shouted. "I saw her first."

The major grabbed him by the shoulder and pushed him back against the wall. "It doesn't matter who saw her first. You keep away from her or there's going to be trouble!"

The captain's face flushed with rage. With a snarl he tore off the major's breechcloth and struck him in the face with it.

The major's face grew hard and cold. He stepped back, clicked his calloused heels together, and bowed slightly.

"Axes or fists?"

"Axes," snapped the captain.

"May I suggest the armory anteroom?" said the major formally. "We won't be disturbed there."

"As you wish, sir," said the captain

with equal formality. "Your breechcloth, sir." The major donned it with dignity and they started down the hall toward Kurt. He turned and fled back down the corridor.

In a second he was back in the ante-room. Unless he did something quickly he was trapped. Two flaming torches were set in brackets on each side of the great bronze door. As flickering pools of shadow chased each other across the worn stone floor, Kurt searched desperately for some other way out. There was none. The only possible exit was through the bronze portals. The voices behind him grew louder. He ran forward, grabbed a projecting handle, and pulled. One door creaked open slightly and with a sigh of relief Kurt slipped inside.

There were no torches here. The great hall stood in half darkness, its only illumination the pale moonlight that streamed down through the arching skylight that formed the central ceiling. He stood for a moment in awe, impressed in spite of himself by the strange unfamiliar shapes that loomed before him in the half-darkness. He was suddenly brought back to reality by the sound of voices in the ante-room.

"Hey! The armory door's open!"

"So what? That place is off limits to everybody but the C.O."

"Blick won't care. Let's fight in there. There should be more room."

Kurt quickly scanned the hall for

a safe hiding place. At the far end stood what looked like a great bronze statue, its burnished surface gleaming dimly in the moonlight. As the door swung open behind him, he slipped cautiously through the shadows until he reached it. It looked like a coffin with feet, but to one side of it there was a dark pool of shadow. He slipped into it and pressed himself close against the cold metal. As he did so his hipbone pressed against a slight protrusion and with a slight clicking sound, a hinged middle section of the metallic figure swung open, exposing a dark cavity. The thing was hollow!

Kurt had a sudden idea. "Even if they do come down here," he thought, "they'd never think of looking inside this thing!" With some difficulty he wiggled inside and pulled the hatch shut after him. There were legs to the thing—his own fit snugly into them—but no arms.

The two officers strode out of the shadows at the other end of the hall. They stopped in the center of the armory and faced each other like fighting cocks. Kurt gave a sigh of relief. It looked as if he were safe for the moment.

There was a sudden wicked glitter of moonlight on axheads as their weapons leaped into their hands. They stood frozen for a moment in a murderous tableau and then the captain's ax hummed toward his opponent's head in a vicious slash. There was a shower of sparks as the major parried

and then with a quick wrist twist sent his own weapon looping down toward the captain's midriff. The other pulled his ax down to ward the blow but he was only partially successful. The keen obsidian edge raked his ribs and blood dripped darkly in the moonlight.

As Kurt watched intently he began to feel the first faint stirrings of claustrophobia. The Imperial designers had planned their battle armor for efficiency rather than comfort and Kurt felt as if he were locked away in a cramped dark closet. His malaise wasn't helped by a sudden realization that when the men left they might very well lock the door behind them. His decision to change his hiding place was hastened when a bank of dark clouds swept across the face of the moon. The flood of light that poured down through the skylight suddenly dimmed until Kurt could barely make out the pirouetting forms of the two officers who were fighting in the center of the hall.

This was his chance. If he could slip down the darkened side of the hall before the moon lighted up the hall again, he might be able to slip out of the hall unobserved. He pushed against the closed hatch through which he entered. It refused to open. A feeling of trapped panic started to roll over him but he fought it back. "There must be some way to open this thing from the inside," he thought.

As his fingers wandered over the

dark interior of the suit looking for a release lever, they encountered a bank of keys set just below his midriff. He pressed one experimentally. A quiet hum filled the armor and suddenly a feeling of weightlessness came over him. He stiffened in fright. As he did so one of his steel shod feet pushed lightly backwards against the floor. That was enough. Slowly, like a child's balloon caught in a light draft, he drifted toward the center of the hall. He struggled violently but since he was now several inches above the floor and rising slowly it did him no good.

The fight was progressing splendidly. Both men were master axmen and in spite of being slightly drunk were putting on a brilliant exhibition. Each was bleeding from a dozen minor slashes but neither had been seriously axed as yet. Their flashing strokes and counters were masterful, so masterful that Kurt slowly forgot his increasingly awkward situation as he became more and more absorbed in the fight before him. The blond captain was slightly the better axman but the major compensated for it by occasionally whistling in cuts that to Kurt's experienced eye seemed perilously close to fouls. He grew steadily more partisan in his feelings until one particularly unscrupulous attempt broke down his restraint altogether.

"Pull down your guard!" he screamed to the captain. "He's

trying to cut you below the belt!" His voice reverberated within the battle suit and boomed out with strange metallic overtones.

Both men whirled in the direction of the sound. They could see nothing for a moment and then the major caught sight of the strange menacing figure looming above him in the murky darkness.

Dropping his ax he dashed frantically toward the exit shrieking: "It's the Inspector General!"

The captain's reflexes were a second slower. Before he could take off Kurt poked his head out of the open face-port and shouted down, "It's only me, Dixon! Get me out of here, will you?"

The captain stared up at him goggle-eyed. "What kind of a contraption is that?" he demanded. "And what are you doing in it?"

Kurt by now was floating a good ten feet off the floor. He had visions of spending the night on the ceiling and he wasn't happy about it. "Get me down now," he pleaded. "We can talk after I get out of this thing."

The captain gave a leap upwards and tried to grab Kurt's ankles. His jump was short and his outstretched fingers gave the weightless armor a slight shove that sent it bobbing up another three feet.

He cocked his head back and called up to Kurt. "Can't reach you now. We'll have to try something else. How did you get into that thing in the first place?"

"The middle section is hinged," said Kurt. "When I pulled it shut it clicked."

"Well, unclick it!"

"I tried that. That's why I'm up here now."

"Try again," said the man on the floor. "If you can open the hatch, you can drop down and I'll catch you."

"Here I come!" said Kurt, his fingers selecting a stud at random. He pushed. There was a terrible blast of flame from the shoulder jets and he screamed skywards on a pillar of fire. A microsecond later he reached the skylight. Something had to give. It did!

At fifteen thousand feet the air pressure dropped to the point where the automatics took over and the face plate clicked shut. Kurt didn't notice that. He was out like a light. At thirty thousand feet the heaters cut in. Forty seconds later he was in free space. Things could have been worse though, he still had air for two hours—

X.

Flight Officer Ozaki was taking a cat nap when the alarm on the radiation detector went off. Dashing the sleep out of his eyes, he slipped rapidly into the control seat and cut off the gong. His fingers danced over the controls in a blur of movement. Swiftly the vision screen shifted until the little green dot that indicated a

source of radiant energy was firmly centered. Next he switched on the pulse analyzer and watched carefully as it broke down the incoming signal into components and sent them surging across the scope in the form of sharp-toothed sine waves. There was an odd peak to them, a strength and sharpness that he hadn't seen before.

"Doesn't look familiar," he muttered to himself, "but I'd better check to make sure."

He punched the comparison button and while the analyzer methodically began to check the incoming trace against the known patterns stored up in its compact little memory bank, he turned back to the vision screen. He switched on high magnification and the system rushed toward him. It expanded from a single pin point of light into a distinct planetary system. At its center a giant dying sun expanded on the plate like a malignant red eye. As he watched, the green dot moved appreciably, a thin red line stretching out behind it to indicate its course from point of first detection. Ozaki's fingers moved over the controls and a broken line of white light came into being on the screen. With careful adjustments he moved it up toward the green track left by the crawling red dot. When he had an exact overlay, he carefully moved the line back along the course that the energy emitter had followed prior to detection.

Ozaki was tense. It looked as if he

might have something. He gave a sudden whoop of excitement as the broken white line intersected the orange dot of a planetary mass. A vision of the promised thirty-day leave and six months' extra pay danced before his eyes as he waited for the pulse analyzer to clear.

"Home!" he thought ecstatically. "Home and unplugged plumbing!"

With a final whir of relays the analyzer clucked like a contented chicken and dropped an identity card out of its emission slot. Ozaki grabbed it and scanned it eagerly. At the top was printed in red, "Identity Unknown," and below in smaller letters, "Suggest check of trace pattern on base analyzer." He gave a sudden whistle as his eyes caught the energy utilization index. 927! That was fifty points higher than it had any right to be. The best tech in the Protectorate considered himself lucky if he could tune a propulsion unit so that it delivered a thrust of forty-five per cent of rated maximum. Whatever was out there was hot! Too hot for one man to handle alone. With quick decision he punched the transmission key of his space communicator and sent a call winging back to War Base Three.

XI.

Commander Krogson stormed up and down his office in a frenzy of impatience.

"It shouldn't be more than another

fifteen minutes, sir," said Schninkle.

Krogson snorted. "That's what you said an hour ago! What's the matter with those people down there? I want the identity of that ship and I want it now."

"It's not Identification's fault," explained the other. "The big analyzer is in pretty bad shape and it keeps jamming. They're afraid that if they take it apart they won't be able to get it back together again."

The next two hours saw Krogson's blood pressure steadily rising toward the explosion point. Twice he ordered the whole identification section transferred to a labor battalion and twice he had to rescind the command when Schninkle pointed out that scrapings from the bottom of the barrel were better than nothing at all. His fingernails were chewed down to the quick when word finally came through.

"Identification, sir," said a hesitant voice on the intercom.

"Well?" demanded the commander.

"The analyzer says —" The voice hesitated again.

"The analyzer says what?" shouted Krogson in a fury of impatience.

"The analyzer says that the trace pattern is that of one of the old Imperial drive units."

"That's impossible!" sputtered the commander. "The last Imperial base was smashed five hundred years ago. What of their equipment was salvaged has long since been worn out and tossed on the scrap heap. The machine

must be wrong!"

"Not this time," said the voice. "We checked the memory bank manually and there's no mistake. It's an Imperial all right. Nobody can produce a drive unit like that these days."

Commander Krogson leaned back in his chair, his eyes veiled in deep thought. "Schninkle," he said finally, thinking out loud, "I've got a hunch that maybe we've stumbled on something big. Maybe the Lord Protector is right about there being a plot to knock him over, but maybe he's wrong about who's trying to do it. What if all these centuries since the Empire collapsed a group of Imperials have been hiding out waiting for their chance?"

Schninkle digested the idea for a moment. "It could be," he said slowly. "If there is such a group, they couldn't pick a better time than now to strike; the Protectorate is so wobbly that it wouldn't take much of a shove to topple it over."

The more he thought about it, the more sense the idea made to Krogson. Once he felt a fleeting temptation to hush up the whole thing. If there were Imperials and they did take over, maybe they would put an end to the frenzied rat race that was slowly ruining the galaxy—a race that sooner or later entangled every competent man in the great web of intrigue and power politics that stretched through the Protectorate and forced him in

self-defense to keep clawing his way toward the top of the heap.

Regretfully he dismissed the idea. This was a matter of his own neck, here and now!

"It's a big IF, Schninkle," he said, "but if I've guessed right we've bailed ourselves out. Get hold of that scout and find out his position."

Schninkle scooted out of the door. A few minutes later he dashed back in. "I've just contacted the scout!" he said excitedly. "He's closed in on the power source and it isn't a ship after all. It's a man in space armor! The drive unit is cut off and it's heading out of the system at fifteen hundred per. The pilot is standing by for instructions."

"Tell him to intercept and capture!" Schninkle started out of the office. "Wait a second; what's the scout's position?"

Schninkle's face fell. "He doesn't quite know, sir."

"He *what*?" demanded the commander.

"He doesn't quite know," repeated the little man. "His astrocomputer went haywire six hours out of base."

"Just our luck!" swore Krogson. "Well tell him to leave his transmitter on. We'll ride in on his beam. Better call the sector commander while you're at it and tell him what's happened."

"Beg pardon, commander," said Schninkle, "but I wouldn't advise it."

"Why not?" asked Krogson.

"You're next in line to be sector commander, aren't you, sir?"

"I guess so," said the commander.

"If this pans out you'll be in a position to knock him over and grab his job, won't you?" asked Schninkle slyly.

"Could be," admitted Krogson in a tired voice. "Not because I want to, though—but because I have to. I'm not as young as I once was and the boys below are pushing pretty hard. It's either up or out—and out is always first."

"Put yourself in the sector commander's shoes for a minute," suggested the little man. "What would you do if a war base commander came through with news of a possible Imperial base?"

A look of grim comprehension came over Krogson's face. "Of course! I'd ground the commander's ships and send out my own fleet. I must be slipping; I should have thought of that at once!"

"On the other hand," said Schninkle "you might call him and request permission to conduct routine maneuvers. He'll approve as a matter of course and you'll have an excuse for taking out the full fleet. Once in deep space you can slap on radio silence and set course for the scout. If there is an Imperial base out there, nobody will know anything about it until it's blasted. I'll stay back here and keep my eyes on things for you."

Commander Krogson grinned.

"Schninkle, it's a pleasure to have you in my command: How would you like me to make you *Devoted Servant of the Lord Protector, Eighth Class*? It carries an extra shoe ration coupon!"

"If it's all the same with you," said Schninkle, "I'd just as soon have Saturday afternoons off."

XII.

As Kurt struggled up out of the darkness, he could hear a gong sounding in the faint distance. *Bong! Bong! BONG!* It grew nearer and louder. He shook his head painfully and groaned. There was light from some place beating against his eyelids. Opening them was too much effort. He was in some sort of a bunk. He could feel that. But the gong. He lay there concentrating on it. Slowly he began to realize that the beat didn't come from outside. It was his head. It felt swollen and sore and each pulse of his heart sent a hammer thud through it.

One by one his senses began to return to normal. As his nose reassumed its normal acuteness it began to quiver. There was a strange scent in the air, an unpleasant sickening scent as of—he chased the scent down his aching memory channels until he finally had it cornered—rotting fish. With that to anchor on he slowly began to reconstruct reality. He had been floating high above the floor in the armory and the captain had been

trying to get him down. Then he had pushed a button. There had been a microsecond of tremendous acceleration and then a horrendous crash. That must have been the skylight. After the crash was darkness, then the gongs, and now fish—dead and rotting fish.

"I must be alive," he decided. "Imperial Headquarters would never smell like this!"

He groaned and slowly opened one eye. Wherever he was he hadn't been there before. He opened the other eye. He was in a room. A room with a curved ceiling and curving walls. Slowly, with infinite care, he hung his head over the side of the bunk. Below him in a form-fitting chair before a bank of instruments sat a small man with yellow skin and blue-black hair. Kurt coughed. The man looked up. Kurt asked the obvious question.

"Where am I?"

"I'm not permitted to give you any information," said the small man. His speech had an odd slurred quality to Kurt's ear.

"Something stinks!" said Kurt.

"It sure does," said the small man gloomily. "It must be worse for you. I'm used to it."

Kurt surveyed the cabin with interest. There were a lot of gadgets tucked away here and there that looked familiar. They were like the things he had worked on in Tech School except that they were cruder

and simpler. They looked as if they had been put together by an eight-year-old recruit who was doing his first trial assembly. He decided to make another stab at establishing some sort of communication with the little man.

"How come you have everything in one room? We always used to keep different things in different shops."

"No comment," said Ozaki.

Kurt had a feeling he was butting his head against a stone wall. He decided to make one more try.

"I give up," he said, wrinkling his nose, "where'd you hide it?"

"Hide what?" asked the little man.

"The fish," said Kurt.

"No comment."

"Why not?" asked Kurt.

"Because there isn't anything that can be done about it," said Ozaki.

"It's the air conditioner. Something's haywire inside."

"What's an air conditioner?" asked Kurt.

"That square box over your head."

Kurt looked at it, closed his eyes, and thought for a moment. The thing did look familiar. Suddenly a picture of it popped into his mind. Page 318 in the "Manual of Auxiliary Mechanisms."

"It's fantastic!" he said.

"What is?" said the little man.

"This." Kurt pointed to the conditioner. "I didn't know they existed in real life. I thought they were just in

books. You got a first echelon kit?"

"Sure," said Ozaki. "It's in that recess by the head of the bunk. Why?"

Kurt pulled the kit out of its retaining clips and opened its cover, fishing around until he found a small screwdriver and a pair of needle-nose pliers.

"I think I'll fix it," he said conversationally.

"Oh no you won't!" howled Ozaki. "Air with fish is better than no air at all." But before he could do anything, Kurt had pulled the cover off the air conditioner and was probing into the intricate mechanism with his screwdriver. A slight thumping noise came from inside. Kurt cocked his ear and thought. Suddenly his screwdriver speared down through the maze of whirring parts. He gave a slow quarter turn and the internal thumping disappeared.

"See," he said triumphantly, "no more fish!"

Ozaki stopped shaking long enough to give the air a tentative sniff. He had got out of the habit of smelling in self-defense and it took him a minute or two to detect the difference. Suddenly a broad grin swept across his face.

"It's going away! I do believe it's going away!"

Kurt gave the screwdriver another quarter of a turn and suddenly the sharp spicy scent of pines swept through the scout. Ozaki took a deep ecstatic breath and relaxed in his

chair. His face lost its pallor.

"How did you do it?" he said finally.

"No comment," said Kurt pleasantly.

There was silence from below. Ozaki was in the throes of a brain storm. He was more impressed by Kurt's casual repair of the air conditioner than he liked to admit.

"Tell me," he said cautiously, "can you fix other things beside air conditioners?"

"I guess so," said Kurt, "if it's just simple stuff like this." He gestured around the cabin. "Most of the stuff here needs fixing. They've got it together wrong."

"Maybe we could make a dicker," said Ozaki. "You fix things, I answer questions—Some questions that is," he added hastily.

"It's a deal," said Kurt who was filled with a burning curiosity as to his whereabouts. Certain things were already clear in his mind. He knew that wherever he was he'd never been there before. That meant evidently that there was a garrison on the other side of the mountains whose existence had never been suspected. What bothered him was how he had got there.

"Check," said Ozaki. "First, do you know anything about plumbing?"

"What's plumbing?" asked Kurt curiously.

"Pipes," said Ozaki. "They're plugged. They've been plugged for more time than I like to think about."

"I can try," said Kurt.

"Good!" said the pilot and ushered him into the small cubicle that opened off the rear bulkhead. "You might tackle the shower while you're at it."

"What's a shower?"

"That curved dingbat up there," said Ozaki pointing. "The thermostat's out of whack."

"Thermostats are kid stuff," said Kurt, shutting the door.

Ten minutes later Kurt came out.

"It's all fixed."

"I don't believe it," said Ozaki, shouldering his way past Kurt. He reached down and pushed a small curved handle. There was the satisfying sound of rushing water. He next reached into the little shower compartment and turned the knob to the left. With a hiss a needle spray of cold water burst forth. The pilot looked at Kurt with awe in his eyes.

"If I hadn't seen it, I wouldn't have believed it! That's two answers you've earned."

Kurt peered back into the cubicle curiously. "Well, first," he said, "now that I've fixed them, what are they for?"

Ozaki explained briefly and a look of amazement came over Kurt's face. Machinery he knew, but the idea that it could be used for something was hard to grasp.

"If I hadn't seen it, I wouldn't have believed it!" he said slowly. This would be something to tell when

he got home. Home! The pressing question of location popped back into his mind.

"How far are we from the garrison?" he asked.

Ozaki made a quick mental calculation.

"Roughly two light-seconds," he said.

"How far's that in kilometers?"

Ozaki thought again. "Around six hundred thousand. I'll run off the exact figures if you want them."

Kurt gulped. No place could be that far away. Not even Imperial Headquarters! He tried to measure out the distance in his mind in terms of days' marches but he soon found himself lost. Thinking wouldn't do it. He had to see with his own eyes where he was.

"How do you get outside?" he asked.

Ozaki gestured toward the air lock that opened at the rear of the compartment. "Why?"

"I want to go out for a few minutes to sort of get my bearings."

Ozaki looked at him in disbelief. "What's your game, anyhow?" he demanded.

It was Kurt's turn to look bewildered. "I haven't any game. I'm just trying to find out where I am so I'll know which way to head to get back to the garrison."

"It'll be a long cold walk." Ozaki laughed and hit the stud that slid back the ray screens on the vision ports.

"Take a look."

Kurt looked out into nothingness, a blue-black void marked only by distant pin points of light. He suddenly felt terribly alone, lost in a blank immensity that had no boundaries. *Down* was gone and so was *up*. There was only this tiny lighted room with nothing underneath it. The port began to swim in front of his eyes as a sudden strange vertigo swept over him. He felt that if he looked out into that terrible space for another moment he would lose his sanity. He covered his eyes with his hands and staggered back to the center of the cabin.

Ozaki slid the ray screens back in place. "Kind of gets you first time, doesn't it?"

Kurt had always carried a little automatic compass within his head. Wherever he had gone, no matter how far afield he had wandered, it had always pointed steadily toward home. Now for the first time in his life the needle was spinning helplessly. It was an uneasy feeling. He had to get oriented.

"Which way is the garrison?" he pleaded.

Ozaki shrugged. "Over there some place. I don't know whereabouts on the planet you come from. I didn't pick up your track until you were in free space."

"Over where?" asked Kurt.

"Think you can stand another look?"

Kurt braced himself and nodded. The pilot opened a side port to vision and pointed. There, seemingly motionless in the black emptiness of space, floated a great greenish gray globe. It didn't make sense to Kurt. The satellite that hung somewhat to the left did. It's face was different, the details were sharper than he'd ever seen them before, but the features he knew as well as his own. Night after night on scouting detail for the hunting parties while waiting for sleep he had watched the silver sphere ride through the clouds above him.

He didn't want to believe but he had to!

His face was white and tense as he turned back to Ozaki. A thousand sharp and burning questions milled chaotically through his mind.

"Where am I?" he demanded. "How did I get out here? Who are you? Where did you come from?"

"You're in a spaceship," said Ozaki, "a two-man scout. And that's all you're going to get out of me until you get some more work done. You might as well start on this microscopic projector. The thing burned out just as the special investigator was about to reveal who had blown off the commissioner's head by wiring a bit of plutonite into his autoshave. I've been going nuts ever since trying to figure out who did it!"

Kurt took some tools out of the first echelon kit and knelt obediently down beside the small projector.

Three hours later they sat down to dinner. Kurt had repaired the food machine and Ozaki was slowly masticating synthasteak that for the first time in days tasted like synthasteak. As he ecstatically lifted the last savory morsel to his mouth, the ship gave a sudden leap that plastered him and what remained of his supper against the rear bulkhead. There was darkness for a second and then the ceiling lights flickered on, then off, and then on again. Ozaki picked himself up and gingerly ran his fingers over the throbbing lump that was beginning to grow out of the top of his head. His temper wasn't improved when he looked up and saw Kurt still seated at the table calmly cutting himself another piece of pie.

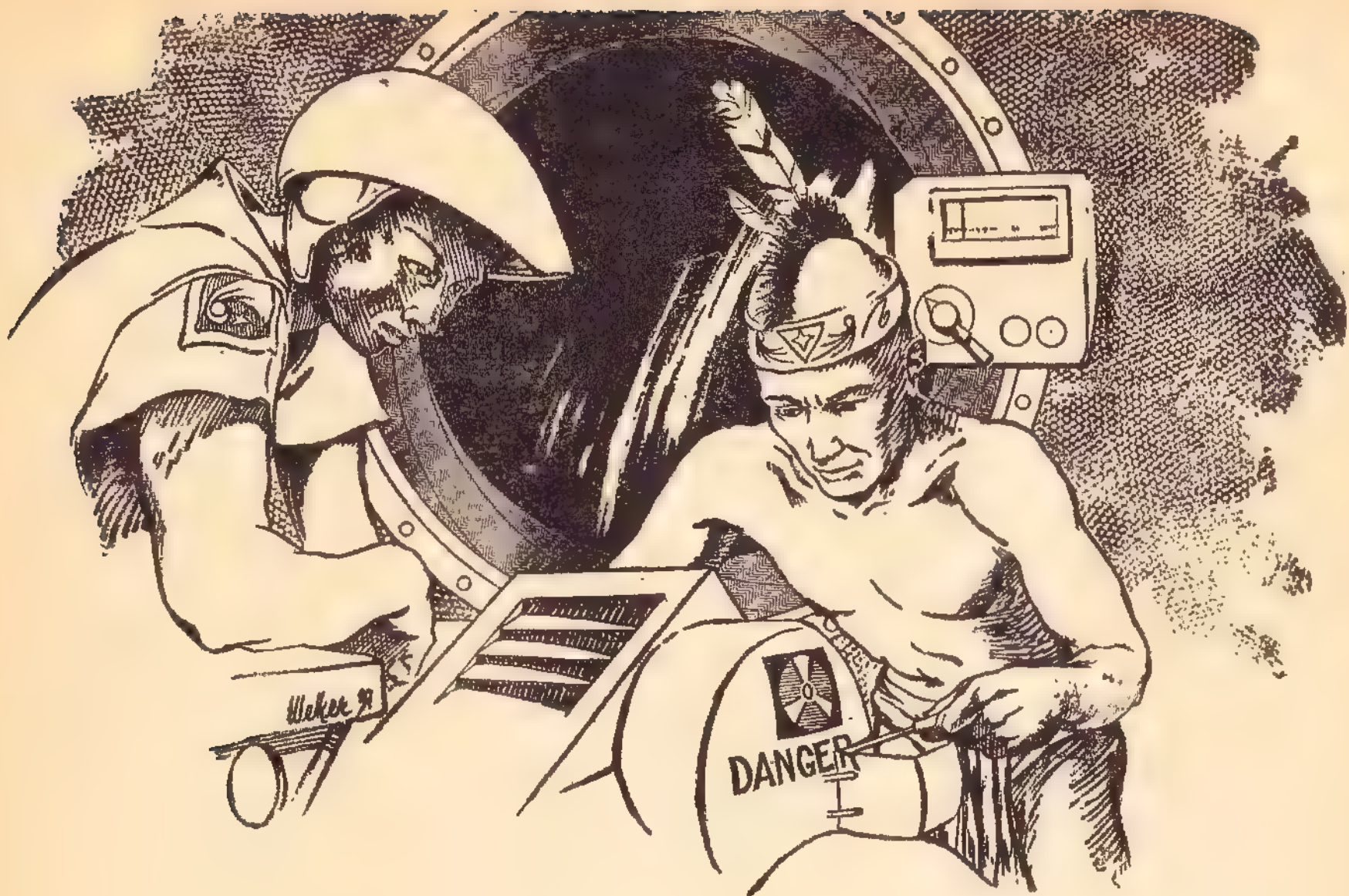
"You should have braced yourself," said Kurt conversationally, "The converter's out of phase. You can hear her build up for a jump if you listen. When she does you ought to brace yourself. Maybe you don't hear so good?" he asked helpfully.

"Don't talk with your mouth full, it isn't polite," snarled Ozaki.

Late that night the converter cut out altogether. Ozaki was sleeping the sleep of the innocent and didn't find out about it for several hours. When he did awake it was to Kurt's gentle shaking.

"Hey!" Ozaki groaned and buried his face in the pillow.

"Hey!" This time the voice was



louder. The pilot yawned and tried to open his eyes.

"Is it important if all the lights go out?" the voice queried. The import of the words suddenly struck home and Ozaki sat bolt upright in his bunk. He opened his eyes, blinked, and opened them again. The lights *were* out. There was a strange unnatural silence about the ship.

"Good Lord!" he shouted and jumped for the controls, "The power's off."

He hit the starter switch but nothing happened. The converter was jammed solid. Ozaki began to sweat. He fumbled over the control board until he found the switch that cut the emergency batteries into the lighting

circuit. Again nothing happened.

"If you're trying to run the lights on the batteries, they won't work," said Kurt in a conversational tone.

"Why not?" snapped Ozaki as he punched savagely and futilely at the starter button.

"They're dead," said Kurt. "I used them all up."

"You what?" yelled the pilot in anguish.

"I used them all up. You see, when the converter went out I woke up. After a while the sun started to come up and it began to get awfully hot so I hooked the batteries into the refrigeration coils. Kept the place nice and cool while they lasted."

Ozaki howled. When he swung the

shutter of the forward port to let in some light he howled again. This time in dead earnest. The giant red sun of the system was no longer perched off to the left at a comfortable distance. Instead before Ozaki's horrified eyes was a great red mass that stretched from horizon to horizon.

"We're falling into the sun!" he screamed.

"It's getting sort of hot," said Kurt. "Hot" was an understatement. The thermometer needle pointed at a hundred and ten and was climbing steadily.

Ozaki jerked open the stores compartment door and grabbed a couple of spare batteries. As quickly as his trembling fingers would work, he connected them to the emergency power line. A second later the cabin lights flickered on and Ozaki was warming up the space communicator. He punched the transmitter key and a call went arcing out through hyperspace. The vision screen flickered and the bored face of a communication tech, third class, appeared.

"Give me Commander Krogson at once!" demanded Ozaki.

"Sorry, old man," yawned the other, "but the commander's having breakfast. Call back in half an hour, will you?"

"This is an emergency! Put me through at once!"

"Can't help it," said the other, "nobody can disturb the Old Man while he's having breakfast."

"Listen, you knucklehead," screamed Ozaki, "if you don't get me through to the commander as of right now, I'll have you in the uranium mines so fast that you won't know what hit you!"

"You and who else?" drawled the tech.

"Me and my cousin Takahashi!" snarled the pilot. "He's Reclassification Officer for the Base STAP."

The tech's face went white. "Yes, sir!" he stuttered. "Right away, sir! No offense meant, sir!" He disappeared from the screen. There was a moment of darkness and then the interior of Commander Krogson's cabin flashed on.

The commander was having breakfast. His teeth rested on the white tablecloth and his mouth was full of mush.

"Commander Krogson!" said Ozaki desperately.

The commander looked up with a startled expression. When he noticed his screen was on he swallowed his mush convulsively and popped his teeth back into place.

"Who's there?" he demanded in a neutral voice in case it might be somebody important.

"Flight Officer Ozaki," said Flight Officer Ozaki.

A thundercloud rolled across the commander's face. "What do you mean by disturbing me at breakfast?" he demanded.

"Beg pardon, sir," said the pilot, "but my ship's falling into a red sun."

"Too bad," grunted Commander Krogson and turned back to his mush and milk.

"But, sir," persisted the other, "you've got to send somebody to pull me off. My converter's dead!"

"Why tell me about it?" said Krogson in annoyance. "Call Space Rescue, they're supposed to handle things like this."

"Listen, commander," wailed the pilot, "by the time they've assigned me a priority and routed the paper through proper channels, I'll have gone up in smoke. The last time I got in a jam it took them two weeks to get to me. I've only got hours left!"

"Can't make exceptions," snapped Krogson testily. "If I let you skip the chain of command, everybody and his brother will think he has a right to."

"Commander," howled Ozaki, "we're frying in here!"

"All right. All right!" said the commander sourly. "I'll send somebody after you. What's your name?"

"Ozaki, sir. Flight Officer Ozaki."

The commander was in the process of scooping up another spoonful of mush when suddenly a thought struck him squarely between the eyes.

"Wait a second," he said hastily, "you aren't the scout who located the Imperial base, are you?"

"Yes, sir," said the pilot in a cracked voice.

"Why didn't you say so?" roared Krogson. Flipping on his intercom he growled, "Give me the Exec." There was a moment's silence.

"Yes, sir?"

"How long before we get to that scout?"

"About six hours, sir."

"Make it three!"

"Can't be done, sir."

"It will be done!" snarled Krogson and broke the connection.

The temperature needle in the little scout was now pointing to a hundred and fifteen.

"I don't think we can hold out that long," said Ozaki.

"Nonsense!" said the commander and the screen went blank.

Ozaki slumped into the pilot chair and buried his face in his hands. Suddenly he felt a blast of cold air on his neck. "There's no use in prolonging our misery," he said without looking up. "Those spare batteries won't last five minutes under this load."

"I knew that," said Kurt cheerfully, "so while you were doing all the talking I went ahead and fixed the converter. You sure have mighty hot summers out here!" he continued, mopping his brow.

"You what?" yelled the pilot, jumping half out of his seat. "You couldn't even if you did have the know-how. It takes half a day to get the shielding off so you can get at the thing!"

"Didn't need to take the shielding

off for a simple job like that," said Kurt. He pointed to a tiny inspection port about four inches in diameter. "I worked through there."

"That's impossible!" interjected the pilot. "You can't even see the injector through that, let alone get to it to work on!"

"Shucks," said Kurt, "a man doesn't have to see a little gadget like that to fix it. If your hands are trained right, you can feel what's wrong and set it to rights right away. She won't jump on you any more either. The syncromesh thrust baffle was a little out of phase so I fixed that, too, while I was at it."

Ozaki still didn't believe it but he hit the controls on faith. The scout bucked under the sudden strong surge of power and then, it's converter humming sweetly, arced away from the giant sun in a long sweeping curve.

There was silence in the scout. The two men sat quietly, each immersed in an uneasy welter of troubled speculation.

"That was close!" said Ozaki finally. "Too close for comfort. Another hour or so and—" He snapped his fingers.

Kurt looked puzzled. "Were we in trouble?"

"Trouble!" snorted Ozaki. "If you hadn't fixed the converter when you did, we'd be cinders by now!"

Kurt digested the news in silence. There was something about this super-being who actually made machines

work that bothered him. There was a note of bewilderment in his voice when he asked: "If we were really in danger, why didn't you fix the converter instead of wasting time talking on that thing?" He gestured toward the space communicator.

It was Ozaki's turn to be bewildered. "Fix it?" he said with surprise in his voice. "There aren't a half a dozen techs on the whole base who know enough about atomics to work on a propulsion unit. When something like that goes out you call Space Rescue and chew your nails until a wrecker can get to you."

Kurt crawled into his bunk and lay back staring at the curved ceiling. He had thinking to do, a lot of thinking!

Three hours later the scout flashed up alongside the great flagship and darted into a landing port. Flight Officer Ozaki was stricken by a horrible thought as he gazed affectionately around his smoothly running ship.

"Say," he said to Kurt hesitantly, "would you mind not mentioning that you fixed this crate up for me? If you do, they'll take it away from me sure. Some captain will get a new gig and I'll be issued another clunk from Base junkpile."

"Sure thing," said Kurt.

A moment later the flashing of a green light on the control panel signaled that the pressure in the lock had reached normal.

"Back in a minute," said Ozaki. "You wait here."

There was a muted hum as the exit hatch swung slowly open. Two guards entered and stood silently beside Kurt as Ozaki left to report to Commander Krogson.

XIII.

The battle fleet of War Base Three of Sector Seven of the Galactic Protectorate hung motionless in space twenty thousand kilometers out from Kurt's home planet. A hundred tired detection techs sat tensely before their screens, sweeping the globe for some sign of energy radiation. Aside from the occasional light spatters caused by space static, their scopes remained dark. As their reports filtered in to Commander Krogson he became more and more exasperated.

"Are you positive this is the right planet?" he demanded of Ozaki.

"No question about it, sir."

"Seems funny there's nothing running down there at all," said Krogson. "Maybe they spotted us on the way in and cut off power. I've got a hunch that—" He broke off in mid sentence as the red top-priority light on the communication panel began to flash. "Get that," he said. "Maybe they've spotted something at last."

The executive officer flipped on the vision screen and the interior of the flagship's communication room was revealed.

"Sorry to bother you, sir," said the tech whose image appeared on the screen, "but a message just came through on the emergency band."

"What does it say?"

The tech looked unhappy. "It's coded, sir."

"Well, decode it!" barked the executive.

"We can't," said the technician diffidently. "Something's gone wrong with the decoder. The printer is pounding out random groups that don't make any sense at all."

The executive grunted his disgust. "Any idea where the call's coming from?"

"Yes, sir; it's coming in on a tight beam from the direction of Base. Must be from a ship emergency rig, though. Regular hyperspace transmission isn't directional. Either the ship's regular rig broke down or the operator is using the beam to keep anybody else from picking up his signal."

"Get to work on that decoder. Call back as soon as you get any results." The tech saluted and the screen went black.

"Whatever it is, it's probably trouble," said Krogson morosely. "Well, we'd better get on with this job. Take the fleet into atmosphere. It looks as if we are going to have to make a visual check."

"Maybe the prisoner can give us a lead," suggested the executive officer.

"Good idea. Have him brought in."

A moment later Kurt was ushered into the master control room. Krogson's eyes widened at the sight of his scalp lock and paint.

"Where in the name of the Galactic Spirit," he demanded, "did you get that rig?"

"Don't you recognize an Imperial Space Marine when you see one?" Kurt answered coldly.

The guard that had escorted Kurt in made a little twirling motion at his temple with one finger. Krogson took another look and nodded agreement.

"Sit down, son," he said in a fatherly tone. "We're trying to get you home, but you're going to have to give us a little help before we can do it. You see, we're not quite sure just where your base is."

"I'll help all I can," said Kurt.

"Fine!" said the commander, rubbing his palms together. "Now just where down there do you come from?" He pointed out the vision port to the curving globe that stretched out below.

Kurt looked down helplessly. "Nothing makes sense, seeing it from up here," he said apologetically.

Krogson thought for a moment. "What's the country like around your base?" he asked.

"Mostly jungle," said Kurt. "The garrison is on a plateau though and there are mountains to the north."

Krogson turned quickly to his exec. "Did you get that description?"

"Yes, sir!"

"Get all scouts out for a close sweep.

As soon as the base is spotted, move the fleet in and hover at forty thousand!"

Forty minutes later a scout came streaking back.

"Found it, sir!" said the exec. "Plateau with jungle all around and mountains to the north. There's a settlement at one end. The pilot saw movement down there but they must have spotted us on our way in. There's still no evidence of energy radiation. They must have everything shut down."

"That's not good!" said Krogson. "They've probably got all their heavy stuff set up waiting for us to sweep over. We'll have to hit them hard and fast. Did they spot the scout?"

"Can't tell, sir."

"We'd better assume that they did. Notify all gunnery officers to switch their batteries over to central control. If we come in fast and high and hit them with simultaneous fleet concentration, we can vaporize the whole base before they can take a crack at us."

"I'll send the order out at once, sir," said the executive officer.

The fleet pulled into tight formation and headed toward the Imperial base. They were halfway there when the fleet gunnery officer entered the control room and said apologetically to Commander Krogson, "Excuse me, sir, but I'd like to suggest a trial run. Fleet concentration is a tricky thing

and if something went haywire—we'd be sitting ducks for the ground batteries."

"Good idea," said Krogson thoughtfully. "There's too much at stake to have anything go wrong. Select an equivalent target and we'll make a pass."

The fleet was now passing over a towering mountain chain.

"How about that bald spot down there?" said the Exec, pointing to a rocky expanse that jutted out from the side of one of the towering peaks.

"Good enough," said Krogson.

"All ships on central control!" reported the gunnery officer.

"On target!" reported the tech on the tracking screen. "One. Two. Three. Four—"

Kurt stood by the front observation port watching the ground far below sweep by. He had been listening intently but what had been said didn't make sense. There had been something about *batteries*—the term was alien to him—and something about the garrison. He decided to ask the commander what it was all about but the intentness with which Krogson was watching the tracking screen deterred him. Instead he gazed moodily down at the mountains below him.

"Five. Six. Seven. Ready. FIRE!"

A savage shudder ran through the great ship as her ground-pointed batteries blasted in unison. Seconds went by and then suddenly the rocky expanse on the shoulder of the moun-

tain directly below twinkled as blinding flashes of actinic light danced across it. Then as Kurt watched, great masses of rock and earth moved slowly skyward from the center of the spurting nests of tangled flame. Still slowly, as if buoyed up by the thin mountain air, the debris began to fall back again until it was lost from sight in quick rising mushrooms of jet-black smoke. Kurt turned and looked back toward Commander Krogson. *Batteries* must be the things that had torn the mountains below apart. And *garrison*—there was only one garrison!

"I ordered fleet fire," barked Krogson. "This ship was the only one that cut loose. What happened?"

"Just a second, sir," said the executive officer, "I'll try and find out." He was busy for a minute on the intercom system. "The other ships were ready, sir," he reported finally. "Their guns were all switched over to our control but no impulse came through. Central fire control must be on the blink!" He gestured toward a complex bank of equipment that occupied one entire corner of the control room.

Commander Krogson said a few appropriate words. When he reached the point where he was beginning to repeat himself, he paused and stood in frozen silence for a good thirty seconds.

"Would you mind getting a fire control tech in here to fix that ob-

scenity bank?" he asked in a voice that put everyone's teeth on edge.

The other seemed to have something to say but he was having trouble getting it out.

"Well?" said Krogson.

"Prime Base grabbed our last one two weeks ago. There isn't another left with the fleet."

"Doesn't look like much to me," said Kurt as he strolled over to examine the bank of equipment.

"Get away from there!" roared the commander. "We've got enough trouble without you making things worse."

Kurt ignored him and began to open inspection ports.

"Guard!" yelled Krogson. "Throw that man out of here!"

Ozaki interrupted timidly. "Beg pardon, commander, but he can fix it if anybody can."

Krogson whirled on the flight officer. "How do you know?"

Ozaki caught himself just in time. If he talked too much he was likely to lose the scout that Kurt had fixed up for him.

"Because he . . . eh . . . talks like a tech," he concluded lamely.

Krogson looked at Kurt dubiously. "I guess there's no harm in giving it a trial," he said finally. "Give him a set of tools and turn him loose. Maybe for once a miracle will happen."

"First," said Kurt, "I'll need the wiring diagrams for this thing."

"Get them!" barked the commander and an orderly scuttled out of

the control, headed aft.

"Next you'll have to give me a general idea of what it's supposed to do," continued Kurt.

Krogson turned to the gunnery officer. "You'd better handle this."

When the orderly returned with the circuit diagrams, they were spread out on the plotting table and the two men bent over them.

"Got it!" said Kurt at last and sauntered over to the control bank. Twenty minutes later he sauntered back again.

"She's all right now," he said pleasantly.

The gunnery officer quickly scanned his testing board. Not a single red trouble light was on. He turned to Commander Krogson in amazement.

"I don't know how he did it, sir, but the circuits are all clear now."

Krogson stared at Kurt with a look of new respect in his eyes. "What were you down there, chief maintenance tech?"

Kurt laughed. "Me? I was never chief anything. I spent most of my time on hunting detail."

The commander digested that in silence for a moment. "Then how did you become so familiar with fire-control gear?"

"Studied it in school like everyone else does. There wasn't anything much wrong with that thing anyway except a couple of sticking relays."

"Excuse me, sir," interrupted the executive officer, "but should we make

another trial run?"

"Are you sure the bank is in working order?"

"Positive, sir!"

"Then we'd better make straight for that base. If this boy here is a fair example of what they have down there, their defenses may be too tough for us to crack if we give them a chance to get set up!"

Kurt gave a slight start which he quickly controlled. Then he had guessed right! Slowly and casually he began to sidle toward the semicircular bank of controls that stood before the great tracking screen.

"Where do you think you're going!" barked Krogson.

Kurt froze. His pulses were pounding within him but he kept his voice light and casual.

"No place," he said innocently.

"Get over against the bulkhead and keep out of the way!" snapped the commander. "We've got a job of work coming up."

Kurt injected a note of bewilderment into his voice.

"What kind of work?"

Krogson's voice softened and a look approaching pity came into his eyes. "It's just as well you don't know about it until it's over," he said gruffly.

"There she is!" sang out the navigator, pointing to a tiny brown projection that jutted up out of the green jungle in the far distance. "We're about three minutes out, sir. You can take

over at any time now."

The fleet gunnery officer's fingers moved quickly over the keys that welded the fleet into a single instrument of destruction, keyed and ready to blast a barrage of ravening thunderbolts of molecular disruption down at the defenseless garrison at a single touch on the master fire-control button.

"Whenever you're ready, sir," he said deferentially to Krogson as he vacated the controls. A hush fell over the control room as the great tracking screen brightened and showed the compact bundle of white dots that marked the fleet crawling slowly toward the green triangle of the target area.

"Get the prisoner out of here," said Krogson. "There's no reason why he should have to watch what's about to happen."

The guard that stood beside Kurt grabbed his arm and shoved him toward the door.

There was a sudden explosion of fists as Kurt erupted into action. In a blur of continuous movement he streaked toward the gunnery control panel. He was halfway across the control room before the pole axed guard hit the floor. There was a second of stunned amazement, and then before anyone could move to stop him, he stood beside the controls, one hand poised tensely above the master stud that controlled the combined fire of the fleet.

"Hold it!" he shouted as the moment of paralysis broke and several of the officers started toward him menacingly. "One move and I'll blast the whole fleet into scrap!"

They stopped in shocked silence, looking to Commander Krogson for guidance.

"Almost on target, sir," called the tech on the tracking screen.

Krogson stalked menacingly toward Kurt. "Get away from those controls!" he snarled. "You aren't going to blow anything to anything. All that you can do is let off a premature blast. If you are trying to alert your base, it's no use. We can be on a return sweep before they have time to get ready for us."

Kurt shook his head calmly. "Wouldn't do you any good," he said. "Take a look at the gun ports on the other ships. I made a couple of minor changes while I was working on the control bank."

"Quit bluffing," said Krogson.

"I'm not bluffing," said Kurt quietly. "Take a look. It won't cost you anything."

"On target!" called the tracking tech.

"Order the fleet to circle for another sweep," snapped Krogson over his shoulder as he stalked toward the forward observation port. There was something in Kurt's tone that had impressed him more than he liked to admit. He squinted out toward the nearest ship. Suddenly his face

blanched!

"The gun ports! They're still closed!"

Kurt gave a whistle of relief. "I had my fingers crossed," he said pleasantly. "You didn't give me enough time with the wiring diagrams for me to be sure that cutting out that circuit would do the trick. Now . . . guess what the results would be if I should happen to push down on this stud."

Krogson had a momentary vision of several hundred shells ramming their sensitive noses against the thick chrome steel of the closed gun ports.

"Don't bother trying to talk," said Kurt, noticing the violent contractions of the commander's Adam's apple. "You'd better save your breath for my colonel."

"Who?" demanded Krogson.

"My colonel," repeated Kurt. "We'd better head back and pick him up. Can you make these ships hang in one place or do they have to keep moving fast to stay up?"

The commander clamped his jaws together sullenly and said nothing.

Kurt made a tentative move toward the firing stud.

"Easy!" yelled the gunnery officer in alarm. "That thing has hair-trigger action!"

"Well?" said Kurt to Krogson.

"We can hover," grunted the other.

"Then take up a position a little to one side of the plateau." Kurt brushed the surface of the firing stud with a casual finger. "If you make me push

this, I don't want a lot of scrap iron falling down on the battalion. Somebody might get hurt."

As the fleet came to rest above the plateau, the call light on the communication panel began to flash again.

"Answer it," ordered Kurt, "but watch what you say."

Krogson walked over and snapped on the screen.

"Communications, sir."

"Well?"

"It's that message we called you about earlier. We've finally got the decoder working—sort of, that is." His voice faltered and then stopped.

"What does it say?" demanded Krogson impatiently.

"We still don't know," admitted the tech miserably. "It's being decoded all right but it's coming out in a North Vegan dialect that nobody down here can understand. I guess there's still something wrong with the selector. All that we can figure out is that the message has something to do with General Carr and the Lord Protector."

"Want me to go down and fix it?" interrupted Kurt in an innocent voice.

Krogson whirled toward him, his hamlike hands clinching and unclenching in impotent rage.

"Anything wrong, sir?" asked the technician on the screen.

Kurt raised a significant eyebrow to the commander.

"Of course not," growled Krogson.

"Go find somebody to translate that message and don't bother me until it's done."

A new face appeared on the screen.

"Excuse me for interrupting, sir, but translation won't be necessary. We just got a flash from Detection that they've spotted the ship that sent it. It's a small scout heading in on emergency drive. She should be here in a matter of minutes."

Krogson flipped off the screen impatiently. "Whatever it is, it's sure to be more trouble," he said to nobody in particular. Suddenly he became aware that the fleet was no longer in motion. "Well," he said sourly to Kurt, "we're here. What now?"

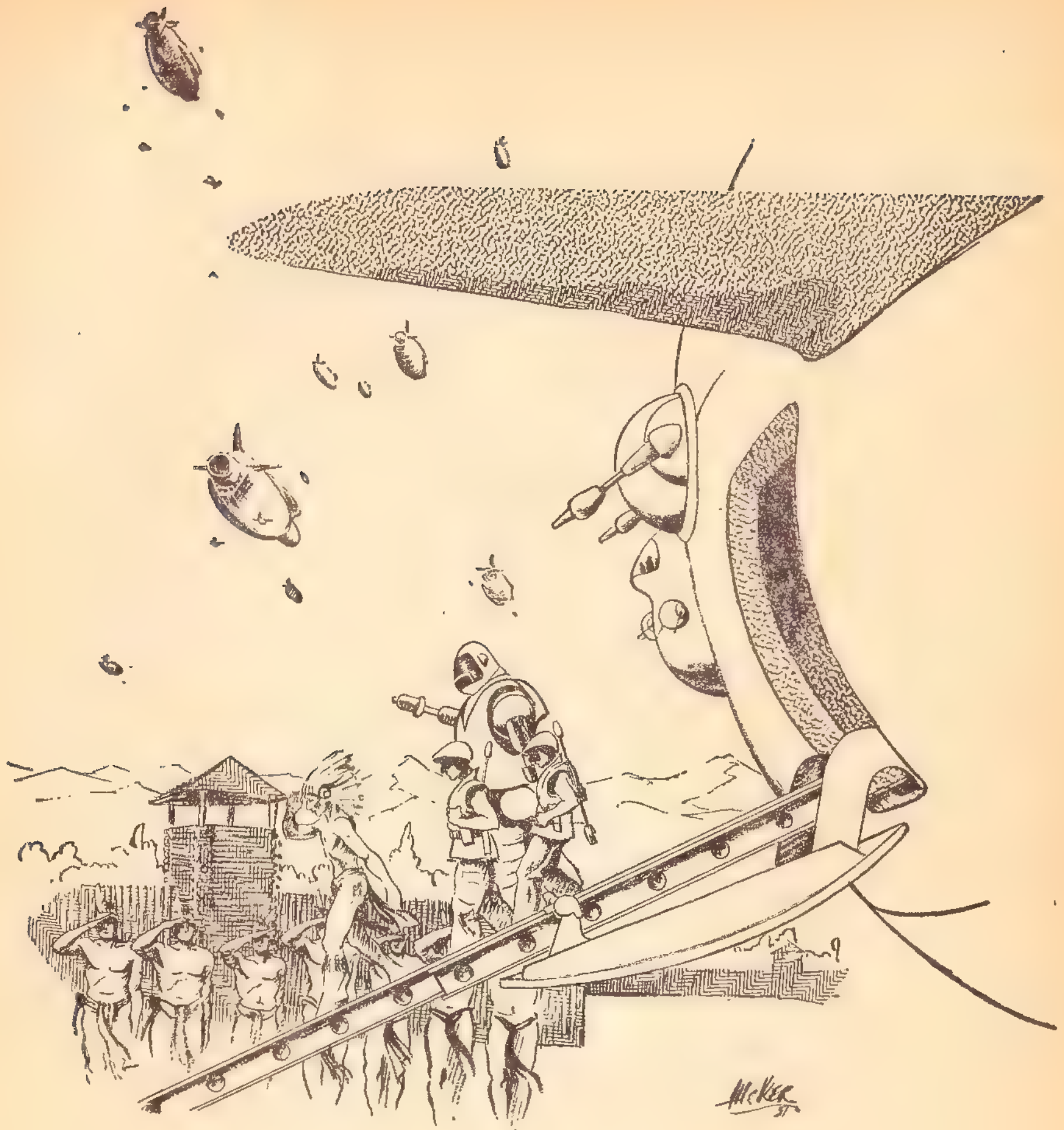
"Send a ship down to the garrison and bring Colonel Harris back up here so that you and he can work this thing out between you. Tell him that Dixon is up here and has everything under control."

Krogson turned to the executive officer. "All right," he said, "do what he says." The other saluted and started toward the door.

"Just a second," said Kurt. "if you have any idea of telling the boys outside to cut the transmission leads from fire control, I wouldn't advise it. It's a rather lengthy process and the minute a trouble light blinks on that board, up we go! Now on your way!"

XIV.

Lieutenant Colonel Blick, acting



commander of the 427th Light Maintenance Battalion of the Imperial Space Marines stood at his office window and scowled down upon the whole civilized world, all twenty-six square kilometers of it. It had been a hard day. Three separate delegations of mothers had descended upon him

demanding that he reopen the Tech Schools for the sake of their sanity. The recruits had been roaming the company streets in bands composed of equal numbers of small boys and large dogs creating havoc wherever they went. He tried to cheer himself up by thinking of his forthcoming tri-

umph when he in the guise of the Inspector General would float magnificently down from the skies and once and for all put the seal of final authority upon the new order. The only trouble was that he was beginning to have a sneaking suspicion that maybe that new order wasn't all that he had planned it to be. As he thought of his own six banshees screaming through quarters, his suspicion deepened almost to certainty.

He wandered back to his desk and slumped behind it gloomily. He couldn't backwater now, his pride was at stake. He glanced at the water clock on his desk, and then rose reluctantly and started toward the door. It was time to get into battle armor and get ready for the inspection.

As he reached the door, there was a sudden slap of running sandals down the hall. A second later Major Kane burst into the office, his face white and terrified.

"Colonel," he gasped, "the I.G.'s here!"

"Nonsense," said Blick. "I'm the I.G. now!"

"Oh yeah?" whimpered Kane. "Go look out the window. He's here and he's brought the whole Imperial fleet with him!"

Blick dashed to the window and looked up. High above, so high that he could see them only as silver specks, hung hundreds of ships.

"Headquarters *does* exist!" he gasped.

He stood stunned. What to do . . . what to do . . . what to do— The question swirled around in his brain until he was dizzy. He looked to Kane for advice but the other was as bewildered as he was.

"Don't stand there, man," he stormed. "Do something!"

"Yes, sir," said Kane. "What?"

Blick thought for a long silent moment. The answer was obvious but there was a short, fierce inner struggle before he could bring himself to accept it.

"Get Colonel Harris up here at once. He'll know what we should do."

A stubborn look came across Kane's face. "We're running things now," he said angrily.

Blick's face hardened and he let out a roar that shook the walls. "Listen, you pup, when you get an order you follow it. Now get!"

Forty seconds later Colonel Harris stormed into the office. "What kind of a mess have you got us into this time?" he demanded.

"Look up there, sir," said Blick, leading him to the window.

Colonel Harris snapped back into command as if he'd never left it.

"Major Kane!" he shouted.

Kane popped into the office like a frightened rabbit.

"Evacuate the garrison at once! I want everyone off the plateau and into the jungle immediately. Get litters for the sick and the veterans who can't

walk and take them to the hunting camps. Start the rest moving north as soon as you can."

"Really, sir," protested Kane, looking to Blick for a cue.

"You heard the colonel," barked Blick. "On your way!" Kane bolted.

Colonel Harris turned to Blick and said in a frosty voice: "I appreciate your help, colonel, but I feel perfectly competent to enforce my own orders."

"Sorry, sir," said the other meekly. "It won't happen again."

Harris smiled. "O.K., Jimmie," he said, "let's forget it. We've got work to do!"

XV.

It seemed to Kurt as if time was standing still. His nerves were screwed up to the breaking point and although he maintained an air of outward composure for the benefit of those in the control room of the flagship, it took all his will power to keep the hand that was resting over the firing stud from quivering. One slip and they'd be on him. Actually it was only a matter of minutes between the time the scout was dispatched to the garrison below and the time it returned, but to him it seemed as if hours had passed before the familiar form of his commanding officer strode briskly into the control room.

Colonel Harris came to a halt just inside the door and swept the room with a keen penetrating gaze.

"What's up, son?" he asked Kurt.

"I'm not quite sure. All that I know is that they're here to blast the garrison. As long as I've got control of this," he indicated the firing stud, "I'm top dog, but you'd better work something out in a hurry."

The look of strain on Kurt's face was enough for the colonel.

"Who's in command here?" he demanded.

Krogson stepped forward and bowed stiffly. "Commander Conrad Krogson of War Base Three of the Galactic Protectorate."

"Colonel Marcus Harris, 427th Light Maintenance Battalion of the Imperial Space Marines," replied the other briskly. "Now that the formalities are out of the way, let's get to work. Is there some place here where we can talk?"

Krogson gestured toward a small cubicle that opened off the control room. The two men entered and shut the door behind them.

A half hour went by without agreement. "There may be an answer somewhere," Colonel Harris said finally, "but I can't find it. We can't surrender to you, and we can't afford to have you surrender to us. We haven't the food, facilities, or anything else to keep fifty thousand men under guard. If we turn you loose, there's nothing to keep you from coming back to blast us—except your word, that is, and since it would obviously be given under duress, I'm afraid that we couldn't attach

much weight to it. It's a nice problem. I wish we had more time to spend on it but unless you can come up with something workable during the next few minutes, I'm going to have to give Kurt orders to blow the fleet."

Krogson's mind was operating at a furious pace. One by one he snatched at possible solutions, and one by one he gave them up as he realized that they would never stand up under the scrutiny of the razor-sharp mind that sat opposite him.

"Look," he burst out finally, "your empire is dead and our protectorate is about to fall apart. Give us a chance to come down and join you and we'll chuck the past. We need each other and you know it!"

"I know we do," said the colonel soberly, "and I rather think you are being honest with me. But we just can't take the chance. There are too many of you for us to digest and if you should change your mind—" He threw up his hands in a helpless gesture.

"But I wouldn't," protested Krogson. "You've told me what your life is like down there and you know what kind of a rat race I've been caught up in. I'd welcome the chance to get out of it. All of us would!"

"You might to begin with," said Harris, "but then you might start thinking what your Lord Protector would give to get his hands on several hundred trained technicians. No, commander," he said, "we just couldn't

chance it." He stretched his hand out to Krogson and the other after a second's hesitation took it.

Commander Krogson had reached the end of the road and he knew it. The odd thing about it was that now he found himself there, he didn't particularly mind. He sat and watched his own reactions with a sense of vague bewilderment. The strong drive for self-preservation that had kept him struggling ahead for so long was petering out and there was nothing to take its place. He was immersed in a strange feeling of emptiness and though a faint something within him said that he should go out fighting, it seemed pointless and without reason.

Suddenly the moment of quiet was broken. From the control room came a muffled sound of angry voices and scuffling feet. With one quick stride Colonel Harris reached the door and swung it open. He was almost bowled over by a small disheveled figure who darted past him into the cubicle. Close behind came several of the ship's officers. As the figure came to a stop before Commander Krogson, he grabbed him and started to drag him back into the control room.

"Sorry, sir," one of them said to Krogson, "but he came busting in demanding to see you at once. He wouldn't tell us why and when we tried to stop him, he broke away."

"Release him!" ordered the commander. He looked sternly at the little

figure. "Well, Schninkle," he said sternly, "what is it this time?"

"Didn't you get my message?" quavered the little man.

Krogson snorted. "So it was you in that scout! I might have known it. We got it all right but Communication still hasn't got it figured out. What are you doing out here? You're supposed to be back at base keeping knives out of my back!"

"It's private, sir," said Schninkle.

"The rest of you clear out!" ordered Krogson. A second later, with the exception of Colonel Harris, the cubicle stood empty. Schninkle looked questioningly at the oddly uniformed officer.

"Couldn't put him out if I wanted to," said Krogson, "Now go ahead."

Schninkle closed the door carefully and then turned to the commander and said in a hushed voice, "There's been a blowup at Prime Base. General Carr was hiding out there after all. He hit at noon yesterday. He had two-thirds of the Elite Guard secretly on his side and the Lord Protector didn't have a chance. He tried to run but they chopped him down before he got out of atmosphere."

Krogson digested the news in silence for a moment. "So the Lord Protector is dead." He laughed bitterly. "Well, long live the Lord Protector!" He turned slowly to Colonel Harris. "I guess this lets us both off. Now that the heat's off me, you're safe. Call off your boy out there and

we'll make ourselves scarce. I've got to get back to the new Lord Protector to pay my respects. If some of my boys get to Carr first, I'm apt to be out of a job."

Harris shook his head. "It isn't as simple as that. Your new leader needs technicians as much as your old one did. I'm afraid we are still back where we started."

As Krogson broke into an impatient denial, Schninkle interrupted him. "You can't go back, commander. None of us can. Carr has the whole staff down on his 'out' list. He's making a clean sweep of all possible competition. We'd all be under arrest now if he knew where we were!"

Krogson gave a slow whistle. "Doesn't leave me much choice, does it?" he said to Colonel Harris. "If you don't turn me loose I get blown up, if you do I get shot down."

Schninkle looked puzzled. "What's up, sir?" he asked.

Krogson gave a bitter laugh. "In case you didn't notice on your way in, there is a young man sitting at the fire controls out there who can blow up the whole fleet at the touch of a button. Down below is an ideal base with hundreds of techs, but the colonel here won't take us in and he's afraid to let us go."

"I wouldn't," admitted Harris, "but the last few minutes have rather changed the picture. My empire has been dead for five hundred years and your protectorate doesn't seem to

want you around any more. It looks like we're both out of a job. Maybe we both ought-to try to find a new one. What do you think?"

"I don't know what to think," said Krogson. "I can't go back and I can't stay here, and there isn't any place else. The fleet can't keep going without a base."

A broad grin came over the face of Colonel Harris. "You know," he said, "I've got a hunch that maybe we can do business after all. Come on!" He threw open the cubicle door and strode briskly into the control room, Krogson and Schninkle following close at his heels. He walked over to Kurt who was still poised stiffly at the fire-control board.

"You can relax now, lad. Everything is under control."

Kurt gave a sigh of relief and pulling himself to his feet, stretched luxuriantly. As the other officers saw the firing stud deserted, they tensed and looked to Commander Krogson questioningly. He frowned for a second and then slowly shook his head.

"Well?" he said to Colonel Harris.

"It's obvious," said the other, "you've a fleet, a darn good fleet, but it's falling apart for lack of decent maintenance. I've got a base down there with five thousand lads who can think with their fingers. This knuckle-head of mine is a good example." He walked over to Kurt and slapped him affectionately on the shoulder.

"There's nothing on this ship that he couldn't tear down and put back together blindfolded if he was given a little time to think about it. I think he'll enjoy having some real work to do for a change."

"I may seem dense," said Krogson with a bewildered expression on his face, "but wasn't that the idea that I was trying to sell you?"

"The idea is the same," said Harris, "but the context isn't. You're in a position now where you have to co-operate. That makes a difference. A big difference!"

"It sounds good," said Krogson, "but now you're overlooking something. Carr will be looking for me. We can't stand off the whole galaxy!"

Schninkle interrupted. "You're overlooking something too, sir. He hasn't the slightest idea where we are. It will be months before he has things well enough under control to start an organized search for us. When he does his chances of ever spotting the fleet are mighty slim if we take reasonable precautions. Remember that it was only by a fluke that we ever happened to spot this place to begin with."

As he talked a calculating look came into his eyes. "A year of training and refitting here and there wouldn't be a fleet in the galaxy that could stand against us." He casually edged over until he occupied a position between Kurt and the fire-control board. "If things went right, there's

no reason why you couldn't become Lord Protector, commander."

A flash of the old fire stirred within Krogson and then quickly flickered out. "No, Schninkle," he said heavily. "That's all past now. I've had enough. It's time to try something new."

"In that case," said Colonel Harris, "let's begin! Out there a whole galaxy is breaking up. Soon the time will come when a strong hand is going to be needed to piece it back together and put it in running order again. You know," he continued reflectively, "the name of the old empire still has a certain magic to it. It might not be a bad idea to use it until we are ready to move on to something better."

He walked silently to the vision port and looked down on the lush greenness spreading far below. "But whatever we call ourselves," he continued slowly, half talking to himself, "we have something to work for now." A quizzical smile played over his lips and his wise old eyes seemed to be scanning the years ahead. "You know, Kurt; there's nothing like a visit from the Inspector General

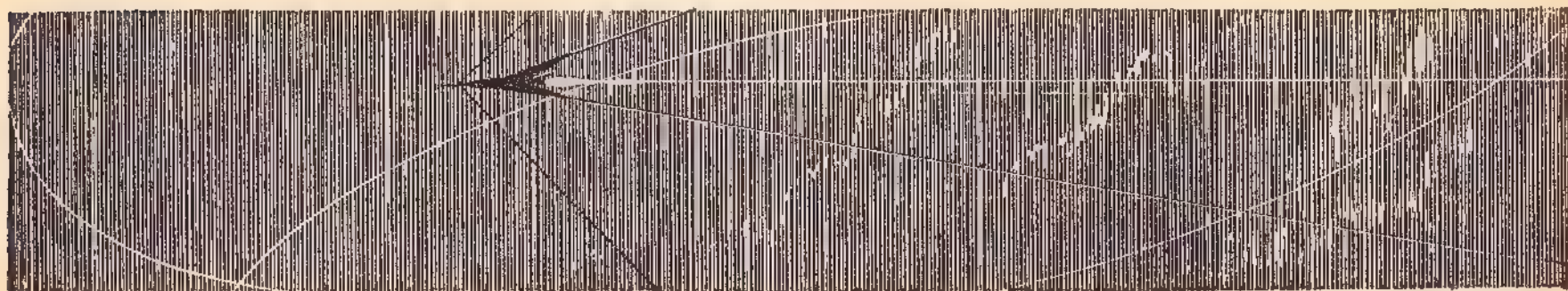
once in a while to keep things in line. The galaxy is a big place but when the time comes, we'll make our rounds!"

XVI.

On the parade ground behind the low buildings of the garrison, the 427th Light Maintenance Battalion of the Imperial Space Marines stood in rigid formation, the feathers of their war bonnets moving slightly in the little breeze that blew in from the west and their war paint glowing redly in the slanting rays of the setting sun.

A quiver ran through the hard surface soil of the plateau as the great mass of the fleet flagship settled down ponderously to rest. There was a moment of expectant silence as a great port clanged open and a gangplank extended to the ground. From somewhere within the ship a fanfare of trumpets sounded. Slowly and with solemn dignity, surrounded by his staff, Conrad Krogson, Inspector General of the Imperial Space Marines, advanced to review the troops.

THE END



THE GHOST TOWN

BY DONALD KINGSBURY

Sometimes a cat gets into trouble; it's got claws that make climbing up a tree easy, but getting down again is tougher. And under certain conditions, getting to the Moon would be like the problem of the tree-climbing cat!



She could feel the body of the City of Citadel rotting in its underground grave. The air fans had an odd whine and they exhaled the smell of a newly dying garden, the city lights were gone, the walls were cold. Years ago space had invaded most of the shafts and corridors and rooms of the old Citadel; now space had under siege the small remnant of this once great outpost. It was a firmly opinionated woman who carried her oil lantern through the upper level hallway. She was quite determined to leave the Moon.

The lantern made weird shadows: a monstrous electric bulb, a warped hand truck, a ladder. She climbed the ladder and a bloated ladder-shadow was cast around her. Then presently she was above the surface level, in the tower of the Seven MPS Transport Corporation. The bare office was as black as the rest of Citadel. She threw the lantern light about the room but found nobody, only the counter and the tables of freight rates and the sign:

"Live Human Freight—\$40 to \$50 per pound. Passage price determined solely by dickering. No round-trip tickets."

She glided behind the counter into the next room but no one was there either. Well, if Abe Srenco was not here in the office he would be "upstairs." She looked at the ladder for a moment, then began to climb it.

Srenco was leaning silently against the mass of his Focomcon—the Flight

Orbital Computer and Controller which calculated the orbits of spaceships entering the Northern Mare Imbrium gravitic field and which piloted those ships in for a landing. He stared into her lantern light curiously. The bright glow from the room's lamp touched the side of his harsh face and an emergency lox-oil electric generator hummed above the whine of the air fan. She started to speak but he cut her short with a gesture, gliding over to the ladderway.

"I don't want to disturb my pilot," he said softly, motioning as he did so toward the earphoned man at the Focomcon's controls. "He's just bringing in a ship now. Anything I can do for you?"

"I'm Mrs. Smith. I have to speak with you."

"Certainly."

"I want to leave the Moon," she said firmly.

"Oh?"

"Right now. This week."

Srenco smiled. "That is too bad. I wish I could offer you passage, Mrs. Smith."

"You won't?" Fright gripped her face. "I have some money," she said stumbling quickly over the words.

"I'm sorry. Even money won't help you. I sincerely wish I could take your life savings. I can't. I can offer transportation to no one. My only passenger ship was grounded at Inyokern Thursday as untrustworthy. The authorities there tell me that they will

never let her blast-off again." He added thoughtfully, "She *was* a bit leaky. She's just an old war can I bought dirt cheap. I couldn't expect her to hang together forever."

"Won't you get another ship?"

"Maybe. But it is not a prosperous business this catering to a cityful of poverty stricken rabble." He looked at tiny Mrs. Smith who was barefooted and wore an old army uniform several sizes too large. "I cannot afford new ships."

Her panic was growing. "How much would passage for me cost?"

"You're about one ten." He paused to make a mental calculation. "If I had a ship, I'd sell you a place for say five thousand dollars."

"That's too much!" she said indignantly. "I'm skinny."

Srenco laughed. "Prices like that don't attract business, I'll grant you," he said, then added harshly, "but I charge them and I'm in debt."

"We have no money. My husband is a gardener and since the power went off his crops are dead. We haven't anything any more." Then she spoke with a hint of hopeful appeal. "On Earth I could earn enough to buy his passage home, and enough to pay for my passage, too."

"Except," Srenco replied sourly, "I have no ship."

"I could go freight. I'm tough. Freight is cheaper, isn't it?"

"Considerably cheaper. But you aren't tough enough to go freight.

One: You'd suffocate. Two: You'd be squashed to death. Three: You'd die of radiation sickness."

Mrs. Smith stared pathetically at Srenco. "Oh Mr. Srenco, I can't stay on the Moon!"

"A lot of people are. I can't even afford my own passage home."

"But I'm pregnant," she said quickly. "Dr. Robin told me this morning. I can't raise a child *here*."

The spaceline owner sighed and spoke more gently to her than he would have spoken to a man. He was partial to women because there were so few of them in Citadel. "Perhaps I can extend to you one hope. See Major Kavam over at garrison headquarters. He might be able to arrange passage for you on the *Caspian Sea*. My pilot is bringing her in now. But I wouldn't count on a bunk. The *Caspian Sea* is the only live can in space since my ship was grounded. Plenty of soldiers want to go home. A lot of enlistments are running out now."

"Thank you," she said. She was crying.

Srenco took her softly by the arm. "Come over to the window. We'll watch the *Sea* blast-in." He wondered how such a frail girl had ever come to be in Citadel. She could have stayed at home. She could have left when Citadel had been abandoned by the United States Army.

Drop. Drop Faster.

Luna grappled feebly with the needlelike ship from Earth, ever so slowly cultivating the strength in her fingers until, of a sudden, the feeble fingers were strong and the wee ship was dropping silently, rapidly toward the Moon's bright gray skin. The ship fought back. Angry white fire burst from her jets and lashed with solar ferocity down upon the lunar globe at better than eight thousand meters per second. The spaceship won the battle. She broke fall above the dark sands of the Northern Imbrium Plain, hovered momentarily as if undecided, and then began to sink to the ground, fins first, jets blazing. The fins touched rock and the stabbing flame died.

Colonel "Handy" Tool stirred in his bunk, stared at the four other empty bunks, loosened his safety belt, and sat up shaky from the landing. He was a veteran of space—this was his third trip—and yet the thunder of rockets beneath him was still scaring. He smiled at himself for being afraid. On Earth people had asked him about space and he had told them. And the tales had become sweeter to his tongue and richer with the retelling. But now he had just suffered another blast-in and he was weak from suspense. So he sat on the bunk's edge, gathering himself.

Outside the Moonscape was dark. Along the eastern horizon of the Imbrium flatlands mountain-teeth grinned blackly, holding, the colonel knew, a ghost town in their jaws, the

city called Citadel. Pale Earth light revealed a glint of metal, a glint of tower below Gaunt Mountain, near the Valley of the Alps. A few huts and a tower, that was Citadel. She had not changed outwardly in these six years since Tool had last glanced at her from the bridge of a ship here on the Imbrium plain. But in 1958 she had been alive. Now she was only a dying ghost town.

War usually destroys cities. The colonel saw in his mind's eye the pathetic flash of a little Ukranian village. Somebody had the town under mortar fire. A Patton tank was burning, its American crew freshly dead, and the buildings beside the tank were on fire. In the street a wounded Russian woman lay moaning Russian prayers to God, while three American equipped "revoltist" infantrymen moved up the street too cold to care for the dead tankmen or the old Russian woman. There were no houses whole. And white snow fell.

War usually destroys cities, but it had built Citadel. Citadel was a fortress. Citadel was a base for liquid fuel Moon-to-Earth rocket bombs. The Pax Americana was the culprit here. Peace was killing Citadel. Her maximum war population of eighteen thousand thriving human beings had dropped by 1964 to less than one thousand nine hundred starvelings. And now Colonel Tool was to evacuate even those few who remained. Indeed, peace had been a disaster for

the Moon's lone town.

For the next thirty-two hours the colonel slept in his tiny bunk or played crap with the *Caspian Sea's* jovial officer-and-crew, Captain Silberman, while the two of them waited out the "decay lay-in." Humans had to stay cooped high inside a spaceship until the radioactive jet-splash from the landing degenerated below the specified level of safety. Eventually the Geiger needles entered the green.

"*Caspian Sea* to Citadel. Geigers in green. Come and get us." That is what Captain Silberman broadcast to the radio tower of Seven MPS Transport at the end of the "lay-in." What did come and get him Colonel Tool did not in the least expect.

It was a battered truck that ground its way across the pumice sand of Imbrium and balked to a stop at the base of the slim spacetransport. The spacesuited colonel was standing near a fin. He did not believe in the truck at first, but it moved and five spacesuited soldiers climbed out. The truck's cycloptic headlamp was mashed at a skewed angle, the tread guards were gone, the outer motor casing was exposed to space, and the monster had lost its air-lock doors.

The colonel cursed with venom. He hated poor equipment in a death trap like space. The best that science could provide was not good enough. So he was angry when he stepped through the hole that had once been a door. There was not even any flooring over

the liquid oxygen tanks. The colonel was mad but he could say nothing. The truck was of war vintage—six or more years old. Citadelians had to use what they had. No replacements were available.

Evacuate the people of the Moon before they kill themselves. Those were Tool's orders. He cringed throughout the whole journey to Citadel, vowing with every rough bounce that he would execute those orders rapidly. No one had the right to use a battered truck in space. It was a killer in an environment that offered no mercy. Better to leave space alone than to die wholesale.

Abe Srenco knocked on the lab door of the Richardson Observatory, then walked in and set his lantern on the table.

"Hello, Olga."

"Hello, Abe."

"Hello, Mr. Srenco," said Olga's little daughter from her perch high atop a cabinet.

Black haired Olga Pyzel was trying to do what her dead husband had wanted to do. She owned a fifty centimeter Schmidt telescope and a ninety-two centimeter reflector and a fine spectroscope, little more. Her working day was fifteen hours long yet she barely earned enough money to keep herself and small Diana alive. The astronomers of Earth paid well for her photographs, but what was good pay on Earth was poor pay on

the Moon.

Srenco turned to Olga. "What is all this I hear from the Pirate?"

"Has the Pirate been talking to you?"

"Yeah," said Srenco. "Yeah, he's been talking to me all right. He wants me to do a special favor for Citadel. From the Pirate that's a laugh. He wants a favor done for Citadel like he wants a hole in the head. As a small token of my esteem for you rabble, I'm supposed to buy Citadel a new power plant. He thinks I love you all a lot, Olga."

The Pirate was a disreputable con-man who owned a mine in the Imbrium Alps. It was a rich mine for sure—rich in ferrous oxide—but that did not bother the stock hungry suckers of Earth. The Pirate was the only man on the Moon who was making any money, a sly operator you never trusted when you could get by with trusting someone else.

"You know we have to have a new power plant," said Olga. "And we aren't asking you to get it either. The Pirate will tend to that."

"Yeah. That's the way he talks, too. He's going to *get* the plant, sure, but it looks like I'm the sucker who will *pay* for it." Srenco spoke bitterly, "Am I the big brass god who doles out grace to every forsaken villager? Am I supposed to offer salvation every time this rat hole gets into trouble? Sure the Pirate will pay for the plant. All I've got to do is ship it here free.

The freight being only seventy per cent of the cost. I can't do it, Olga. I've got too many creditors already, and too many broke people who owe me money."

"We'll die then," said Olga sharply.

"Look. If I bring in that power plant free, I go bankrupt. If I go bankrupt, Citadel loses contact with Earth—in which case Citadel also dies."

"But can we stand the dark much longer?" asked Olga.

"The sun rises tomorrow."

"And sets in fourteen days. What will we do then?"

During the daylight hours giant sun engines out on Mare Imbrium generated current for Citadel. Some of the current was used in the city's machines and lights and gardens. The rest of it was used to create fuel for the long night—to purify contaminated uranium slugs, to manufacture plant oil and liquid oxygen. Since Citadel was dependent upon atomic energy at night, the loss of her reactor broke the steady flow of power into the city. With the sun gone there was oil for lanterns and trucks, and oxygen, but little electricity. Without electricity the red-orange lamps in the gardens ceased to function and without photonic nourishment the crops died. And dead crops over any period of time meant starvation because nobody on the Moon earned enough dollars to eat food shipped in from Earth.

"Mr. Srenco, please don't be mad at Olga." Little Diana slid from her

perch and looked up at the space-transport man. "She's just scared of the dark. She can't help it."

"And aren't you scared of the dark, baby?"

"No," retorted a solemn Diana. "I'm not afraid of the dark. I think lanterns and wicks are fun and when I sneak down an inky corridor I pretend there's a big wolf chasing me and that's exciting."

Srenco smiled. "And what happens when the wolves catch you?"

"Oh, they don't. They're scared of me." Then she added irrelevantly, "Are you scared of the dark, Mr. Srenco?"

"I probably am, baby."

Diana turned to her mother. "The plants are scared, too, aren't they, Olga?" And then she smiled shyly at the two adults. "Look. I got it this morning." She climbed up on the star-map desk and took down an ugly little vegetable from beside the room's lamp. "Look. It's all white. It got gray hair it was so scared of the dark." To Diana this was a tragedy. She held the sorry plant up for inspection. "It's going to die of fright, isn't it, Mr. Srenco?"

"Yes, poor thing."

"Then what will we eat?" she demanded suddenly.

Srenco sighed and spoke to Olga. "A poor sweet gardener's wife was begging me for passage home yesterday morning. Her whole life is tied up in a couple of rooms filled with with-

ered sprouts like that." The thought made him curse. "If I owned a fleet, I'd herd you rabble off to Earth!"

"You'd never get *me* to leave, Abe."

Srenco shrugged. "What can a man do with a village full of stubborn peasants? Nothing. I suppose I'll have to get that power plant up here before you kill yourselves."

"Thank you," said Olga.

"Oh, shut up!" said Srenco.

The thin corona, then the prominences, then the hot sun itself crept above the Lunar Alps and the first feeble current from the Imbrium solar engines began to trickle into the city. Day had come to Citadel. Here and there a fluorescent light flickered on, motors began to turn over, employment notices were hung out, and a crew of gardeners went to work in the big salt tanks seeding a new ten-day crop of algae.* People were happier than they had been since the power failure. They were glad to put away the lanterns and the groping.

Colonel "Handy" Tool stepped through the mess-hall door, braked his glide, and looked about the room. Vision was not good because most of the lights were still off and so it was a while before he saw Abe Srenco.

Abe Srenco.

The face and the name together closed a switch in his mind. They had met before. Srenco was a boy during

* The algae, treated to grow as eighty per cent fatty plants, were used in making oil for oleomargarine, truck fuel, et cetera.

Citadel's heyday, a pipsqueak midshipman of the Rocket Maintenance Yard who liked to talk, liked coffee, and liked to rib the Army. He had been an ordinary Midwesterner inclined toward gaiety, but now sitting over his dinner he looked harsh, in his thirties, and a bit sick.

"Hello swabby, remember me?"

Srenco glanced up, smiled, and then returned to his plate. "Sure I do. I saw your name on the *Caspian Sea's* passenger list and figured our bad luck was still holding out. You're that stupid Army colonel who picked targets. I remember you went back to Earth to look over bomb damage. Did we ever hit anything?"

"Sometimes," said the colonel.

"And now you're on the Moon to see what hit us, eh? Major Kavam has reported what a sorry state we're in and you are the brass god that is going to tidy things up."

"Of course, of course."

"All I hope is you have some money," said Srenco sourly. "What we try to do with our wooden nickles never works. Have a seat. Have some cake, Handy." He looked at the colonel squarely. "If you really want to help us, I know what you can do. You could pay the freight on a new exchange unit for our reactor."

"No," said Tool. "You won't need it."

"We'll hire glowworms, eh?" snapped Srenco.

"With a few new parts and a little

tinkering on the old exchange, the reactor will keep producing a couple of months longer. I don't imagine you'll get much wattage, though."

"Another baling wire job," said Srenco bitterly. "And what do we do after a couple of months?"

"I intend to evacuate Citadel."

Srenco was shocked.

What? Evacuate Citadel.

He could make no ready adjustment to that compact statement.

"Look," he babbled. "Wait a minute." Then he stopped, collected his slowly sinking heart, and managed an answer. "Some of us won't leave," he said.

"Oh, but you will," insisted the colonel. "I can kick the props out of this colony one by one. First the Army personnel go." He grinned maliciously.

Soldiers had the habit of selling government goods at reasonably cheap prices. This black market was an almost essential facet of the Lunar economy. Without such under-the-counter business Citadel would be at a bad loss. Srenco knew it. He said nothing.

"And then," went on the colonel, "when we offer free transportation back to Earth how many Citadelians will choose to stay? A few perhaps, but not enough to keep the body of Citadel alive. Suppose there aren't any gardeners left? Or suppose all the electricians leave? You are finished then. You will have to leave."

The inevitable had happened. A waning, war-induced space travel had suffered its final blow. Srenco had been expecting some such catastrophe. His reaction was to curse the colonel. Tool was a progress destroyer, a defiler of hope, a meddling son sprung from useless ancestors. Such exclamations relieved the pain within him but did not in the least alter any facts. He stopped cursing.

The colonel only grinned. "I'm just one of these queer men who believe in the sanctity of human life. I don't want to see you killed, that's all. If I have to force you to safety, I'll force you."

"Then why don't you build Earth a big incubator and we'll all crawl inside! Would that make you happy?"

"Abe, I don't know if you ever thought about it but I've killed enough people to make me burn for the rest of my life after I'm dead. I've been touring Russia, the places where our bombs hit. In some cities there are still thousands of people buried in the rubble. Remember, I was the fellow who picked the targets. I'm responsible for killing a million people and maiming a million others. I saw some of those people with big radiation scars, and I figure I put those burns there. My orders fixed the orders in the rockets' brains. As long as I live I never want to see another human killed. There are almost two thousand of you here in Citadel living in extreme danger. If I can keep you from getting killed, I

will. Do you believe me?"

Srenco was turning his vegetable stew bowl slowly in a circle. He growled his reply. "Two million Rus-kies, so what? There are more of them now than there were at the beginning of the war. Two thousand Americans, so what? Leave us alone. We're expendable. Can't fools get themselves killed any more?"

"I can prove to you," the colonel continued, "that what is left of this rotten city is ready to collapse, or blow up, or get holed. The entire colony in a reasonably short time will be destroyed without mercy by a relentless space. The poor tenacious people of Citadel do not deserve that, Abe."

"Oh shut up. You're making me sick." Srenco knew the desperate condition of the city.

"Abe. *You know that Citadel is finished. You are afraid to face it because you don't know what to do about it and you don't want to leave.*"

"I'll never leave space," said Srenco stubbornly. "If I have to blast-off from Inyokern instead of the Moon, O.K., but I'll never leave space alone. I'll never abandon space flight."

"You don't have to, but *this colony* has to be abandoned. If you want, I'll give you the contract to build up the modest space fleet necessary for the evacuation. It will put your company back in the black and you can start fresh again on Earth. How's that?"

Srenco grumbled. He got up, picked

up his tray, muttered. His voice was a nothingness. Then he glided away all chewed up inside, leaving the colonel at the bench.

The dead crop lay uprooted on the floor around the hydroponic tanks, but such things did not perturb gardener Smith overmuch. Farmers for aeons had been losing their crops. Smith was busy setting out the sprouts from a pile of germinating mats with rapid little motions of his right hand. He had half the new crop planted already and the red-orange lights were adjusted for maximum stimulation.

"Al! Al!" It was gardener Smith's young wife who came rushing through the garden door trampling the dead leaves with bare feet. "Al, I've just been speaking to Major Kavam like Mr. Srenco told me to do. We're going back to Earth! Both of us!"

Smith was a big, simple fellow. He smiled at his wife without interrupting the planting. "How did you work that, child?" He was obviously pleased.

"The whole base is to be evacuated before the year is out."

Smith just shook his head happily and she kissed the back of his head and wrapped her arms around his neck.

Little Diana Pyzel was only mildly drunk—a few sips of home brew at the local Rum House—but what she lacked in alcohol she made up by pretending. She had seen drunken men.

Diana was rebounding off a corridor



wall with a glassy smile on her face when she met Colonel Tool. He was rather startled but she knew exactly what to do. She grabbed his hand and pumped it.

"Hello, Mr. Soldier." Her words were appropriately slurred. "I'm a soldier, too. See," she said pointing to the patch on her sleeve. "I belong to the Ninety-second Division."

Whereupon she continued to reel down the hallway in a vaguely spiral glide singing a song favored by drunken spacemen.

Colonel Tool loved children. He was left openmouthed for as long as it took him to gather his rage potential. Then he filled himself with indignant fury. Diana was bare footed and wore an old, somewhat cut-down Army shirt with a drawstring at the waist. To boot she was drunk. It made him rage to see this child impoverished and degraded because her parents would not leave the Moon for a decent home. Well, fumed the colonel, this little girl and her mother would be among the very first to be evacuated. That was for sure.

That was for sure.

Abe Srenco's helmet lamp reluctantly touched the battered bulkheads, the slanting floors, the gutted rooms of old Citadel. It was sickening for him to look this part of the city over, ravaged as it was by the penniless scavengers who lived in one small corner of its vast expanse.

Srenco stopped his upward glide beside a light titanium girder to stare down moodily into the old Snack Bar. The fixtures and the air fan were stripped away. The kitchen was gone. The floor was gone and the counter hung precariously over nothingness. Only the paintings on the walls were left, though they had been blistered by the heat and cracked by the cold of space.

Too many memories were here in the Snack Bar for Srenco to take the scene impassionately. The wild days of the war peak were here, and faces were here, and crazy talk-talk about a will-o'-the-wisp future, and the smell of English muffins. The Snack Bar had once been the off-work center of a boom town. Now it was a kilometer beyond the periphery of a shivering, clawing ghost town.

Homesickness became overwhelming; desire for that brief bright "golden age" of yesteryear, unendurable.

Srenco moved on, but everywhere lay the evidence that Citadel was a peace-torn carcass buried in a lonely lunar mare, a weakling thing that space would not tolerate for long. He passed through empty corridors; through the naked rocket assembly plant, and up onto the surface via the elevator shaft that had once raised the Moon-to-Earth rockets up into the firing stage but was now only a lava shaft for the stars to glare down.

This was not the usual route to reach the surface, however, Srenco

had wanted to look at the old city once again to confirm irrevocably in his own mind the validity of what the colonel had been saying.

She's finished. That was what Srenco now thought of Citadel.

And so there was a fleet to assess. He adjusted his sunshield to the harsh blow of Sol's heat and moved in slow leaps out across the mare toward the abandoned naval yard.

Four hundred ships were there, rotting with the sun on their sides—the elegant spacetransports, the stubby freighters, all in neat rows. Such had been the fate of space travel.

The first ship that Srenco tackled was the old *Lake Ontario*. Like all freighters she was built squat in order to combine high structural strength and maximum cargo space with minimum mass. She carried no lead shielding whatever because she had no use for a crew, and because she was without crew neither weight nor space was wasted on crew comforts such as food, ventilators, oxygen tanks, bunks, et cetera. Being without crew also had other economic advantages. The freighters were not chained to the ballistically inefficient four-gravity acceleration. They could stand as many G's as could their light framework.

The *Lake Ontario* had everything a good commercial spaceship should have. She certainly could carry goods at "reasonably" cheap rates from the Earth to the Moon. But she could not carry humans, animals, gamma sensi-

tive chemicals, et cetēra.

Space rot is a diabolical thing. That is why the builders of Citadel put the bulk of the city underground. Space rot is a dry rot caused exclusively by extreme temperatures, sudden changes in temperature, and to a certain small extent by ultraviolet radiation. The *Lake Ontario*, exposed to such conditions for five years, was space rotten.

Srenco could feel sharp crackings in the "can" through the glove of his spacesuit. That was due to the falling shadows and uneven co-efficients of expansion which unfortunately caused leaky seams. The *Lake Ontario* was no longer air-tight. And not only was she leaky—the insulation in delicate electrical equipment was carbonized, air lock doors were jammed, "fuel" pump turbines were sprung, "fuel" tank walls were warped, and glass was fused to instrument, et cetera.

And on top of that the *Lake Ontario* happened to be obsolete. Modern pumps could handle ten times the liquid capacity per kilogram of pump. Modern rocket motors, such as those of the *Caspian Sea*, could deliver a thrust two thousand meters per second greater at half the plutonium consumption than could the crude motors built during the late '50s.

All day as Srenco worked he was lost in memory, lost to the recollection of days long gone when these very ships had been blasting in, one every forty minutes around the clock, the days when Citadel had been so hungry

for supplies to build up her bombing potential that Maintenance had even repaired "hot" freighters to keep them from the idleness of the "decay lay-in," the days when space cans had bad habits like wobbling, and digesting motors, and forgetting to land, and "molting" fins.

But today that grand Lunar fleet was a ghost, fair companion to a ghost town. The eastward pointing shadows shrouded the deserted naval yard while Srenco surveyed the ruin from the broken bridge of a slim transport. It was not a hopeless junk dump. The core of that fleet could be rebuilt. It could evacuate Citadel. It could crush the hopes of those who pined for even the smallest handful of stars.

Olga Pyzel looked down on Srenco's sober face. "Where are you, Abe?" she asked gently. "You're not with me tonight."

"I'm back on Earth," said Srenco.

"Are you thinking about Earth?"

"Yes."

"Does it make you homesick?"

"No."

Olga pouted. "Why don't you talk to me instead of saying 'yes' and 'no'?"

"I'm just thinking that I better get a job lined up for myself on Earth."

Olga stared at Srenco wide-eyed. "You're not leaving us?" She shook him by the shoulder. "What's happened?"

He turned his head. "No. I'm not

leaving you. But I'm going back *with* you to Earth."

"Make sense," demanded Olga. "Who's going back?"

"Colonel Tool has ordered Citadel evacuated, that's all."

"He can't do that!"

"He is."

"Don't let him, Abe!"

Srenco smiled weakly. "I have the contract to do the evacuation. Tool pays for it. I supply the service."

Olga was bewildered. "Oh no, Abe!"

"I'm a traitor, eh?"

"Yes, you're a traitor," she screamed at him. "You're a turncoat and a louse! Why, Abe?"

It was Srenco's turn to shout. "*Because Citadel is finished!*"

"It isn't," she yelled.

"Says a fool like you!"

Olga slapped him for that. "It isn't. It isn't." She slapped him again. "It isn't."

He had to grab her wrists then, for she had become an avenging fury.

The fat Pirate was wearing a blue robe and slippers when Olga Pyzel called on him. His rooms were perhaps the only decent accommodations in Citadel outside of Major Kavam's "house." He ushered her inside.

"Do be less nervous, Olga. Sit down. Have some alcohol." He half filled her space flask with strong beer.

"I'm not nervous," said Olga taking the beer nervously. "I'm just distressed. I want to talk to you about

the evacuation."

"A distressing subject to be sure."

"I want to ask you one question," said Olga. "Are you going to fight it?"

"Probably not." The ex-supply sergeant smiled lazily.

"Why?" she demanded.

The Pirate shrugged. "And what is the use?"

"Do you want to see an Empire of the Inner Solar System?"

"Not especially," said the Pirate, amused.

"Then why are you here?"

"For the fun of it. Maybe the police want me on Earth. Maybe I have a battle-ax for a wife back home. Maybe I like to tinker in mines. That answer your question?"

"No!" she said emphatically. "You don't want Citadel evacuated any more than I do."

"Perhaps not."

"Then why don't you help us fight?"

"Why waste the energy when the evacuation plans are only talk?"

"In a month they won't be talk!" Olga flared.

"Lady, I disagree." The Pirate shook his fat head. "Citadel will never be evacuated. For once the grand Pax Americana is doing you a favor. Peace is a sadist, Olga. It is going to starve Citadel to skin and bones but it is never going to let Citadel die."

"Why?" demanded Olga.

The Pirate smiled but would commit himself no further. "I might be

wrong, of course," he said finally.

Within the week Srenco sat down bitterly to draft his report. He fiddled and dawdled, reluctant to write. The report would be nothing less than executioner's instructions.

History, thought Srenco, will have things to say about us and the war and mankind. Eurasia degenerated, we dissolved, the whole periphery gone to pot. He meditated aimlessly upon such things rather than type the report.

There had been no sharp ending to the Third World War, no VJ-like day, no sudden termination of war contracts, no surrender, not even a peace treaty. The main war petered out when carefully cultivated internecine conflict, and carefully placed Allied forces, and careful aerial attack began to paralyze the Asian hemisphere. In the autumn of 1958 the tired Western armies began a slow demobilization. By the summer of 1960 intelligence reports indicated that, except for a fringe of shaky nations along the North Atlantic coast, the degenerating transportation and communication network of Eurasia had utterly collapsed. Eurasia was infested by more than three thousand autonomous warlords, presidents, "regional councils," politburos, et cetera, and innumerable small armies. It was not the first time in human history that interregnum had cloaked a civilization.

In such a mental environment Abe Srenco acquired a charter for his

Seven Miles Per Second Transport Corporation. He bought a few multi-million dollar ships off the War Surplus Board for twenty thousand dollars—seven Lake Class freighters and one Ocean Class transport—and opened up his service when the United States Navy had all but quit the Moon.

Something like the relief that fills a driver who finds himself missing the car he was skidding into entered the North American mentality in the late '50s. By the beginning of the new decade that relief had blown up into a full emotional jag. The American people felt that the endless World War Playoff Series was over, not because they were naive enough to assume that humans had learned a lesson but because they saw not even the remotest potential enemy in the farthest cranny of Earth. Such a political situation had not existed since the days of the Pax Romana. It made the average United States citizen feel big and good. Still a bit wobbly at the knees they stood around in circles patting each other on the back. The feeling was good. *We can do anything*, they said.

Srenco, being an American, agreed.

He was the genius who was going to open up the Inner Solar System. He had plans. He had ambition. He had drive. He was going to have a spaceship research division, and a spaceship factory. The United States owned heaven as well as Earth—but it didn't work out that way. Srenco and a lot of other fools who stayed in Citadel did

not know the financial facts of life. A military budget can supply a base on the Moon just as simply as it can ship coal in airplanes. No trouble at all. But Srenco was a civilian. He ran out of money.

He had to cut his rates. He had to learn ruthless efficiency. His rocket motors were pressed into delivering maximum exhaust velocity in spite of the danger. His Focomcon pilots had to land his ships fast and with no fuss—or else. He had to starve his employees. He had to strip the idle monsters in the naval yard when repairs were needed. He had to squeeze his fellow Citadelians and rob dead men. Just to stay in business. Still he never made any money, nor was he able to lay away cash for the inevitable time when he would have to replace the ships in his small fleet.

An omen of disaster.

Seven MPS became destitute, yet Srenco kept it running for it was the only real link between Citadel and Earth. But the link had been breaking down. Less people came to the Moon, and less people left it. Less equipment was imported; even the flow of necessities had dwindled by more than fifty per cent since '62.

Space had a death hug on Citadel. The energy gap between Earth and Moon was just too great for economic and social intercourse. Energy happened to have a frightful price tag. And so the war-won American Empire was going to retract in upon itself

again. It had been retracting steadily for five years, unable to digest its conquests.

There was nothing for Srenco to do but gather the facts, make the estimates, assemble the figures, compute the ways and means. He began to type.

Little Diana was afraid of something. She huddled atop a pile of empty oxygen cylinders deep inside the dim catacombs of Citadel, afraid of what was going to happen. She was afraid of Earth.

Mr. Srenco had said: *We'll all be living on Earth in a little while, baby. It's too bad, but those are the breaks you get. I don't want you to die.*

Then Olga had said the same day, *I'll die if I ever go back to Earth. I'll never let them take you there, Diana dear.*

Big fat Earth lived in a dark sky. It was a bad place, so Diana thought. It was bad because it made grown-ups unhappy. But why did it make grown-ups so sad? Diana didn't know. Earth was far away in the sky; that was the only reason she could think of. It was so far away from home that if they ever went to live there they might never see Citadel again. And maybe Olga would die, and Mr. Srenco might die, and everybody might die. Like Papa.

Diana fidgeted on the cylinders, figuring out all the angles on Earth. Earth was a big bad place. It had wild-gardens as big as Mare Imbrium full of monster plants that grew higher

than twenty tall men standing on each other's shoulders. And crazy animals with four legs and no hands lived in the branches. And there weren't any electric lamps around to show you where the ground was, just the sun that couldn't get through the leaves. And people were so heavy that if an animal jumped them they couldn't run away.

Then there were the seas, too.

Diana shivered. Why couldn't everybody stay in Citadel? Space was crisp and clean. It wasn't full of scary things like animals and trees and waves and swordfish. She began to cry. She was afraid of Earth.

Inside Seven MPS Transport's inner office Colonel Tool listened to sounds—the faint humming from a cranky fluorescent, the rustling of paper, breathing, foot taps on the hard floor, a cough from Srenco, the squeak of Srenco's chair. Tool was examining the typewritten pages of Srenco's report with distaste. He had been stopped by one item for a long time, long enough so that all the irritating sounds in the room caught his attention. Eventually he scowled, slapped the page on the desk, stared at it furiously.

"Ridiculous!" he snorted.

"Yes?" asked Srenco.

"I'm at the costs," roared Tool. "I've never seen such padding in my life! Ridiculous!"

"Yeah?" said Srenco. He ambled in a short arc to the desk. "Where did I

make a mistake?"

Tool motioned Abe back to his seat. "I'm not sure you made a mistake." He grumbled, read on.

Srenco had developed essentially seven points:

(1) Approximately three hundred thousand pounds of live human flesh have to be moved to Earth on a very short-term basis which naturally will involve an abnormal capital investment per delivered pound.

(2) Any transport vessels considered will have to have a needle body—to keep the passengers as far as possible from the deadly motors—will have to be heavily leaded, have a maximum acceleration of four G, carry heavy cabin equipment, and meet new Inyokern safety requirements—a kind of ship which inevitably has a high ship-fuel-mass to freight-mass ratio and consequently cannot compete in cost with the relatively efficient space freighter.

(3) The small fleet of late-war Ocean Class transports are not available for any evacuation of Citadel since they have all been stripped down to uselessness by the Seven MPS Maintenance Division. This leaves the old standby, the double-S-five, as the only ship represented in enough quantity to carry out the evacuation, however, the double-S-fives were thrown together in the early days of space travel. They are space-going coffins, having a strong tendency to cough up their insides or cease to

function while in mid-flight. Their motor's exhaust velocity is less than five thousand meters per second. Their landing equipment is worth Moon-air. Their safety equipment is nonexistent. Their shielding worthless. Shipmasters of the double-S-fives during the late war had the unhappy habit of dying from radiation sickness. Consequently a radically revised edition would have to be built around the frame of the old double-S-five, incorporating modern spaceship technology.

(4) Such radical remodeling requires a probable reduction of the passenger capacity to two-three people not including the shipmaster. It requires skilled labor and much equipment not available in Citadel. Freighters to carry equipment to the Moon—and "fuel" for the transports—would have to be reconditioned, and transportation facilities would have to be supplied to import the needed workers.

(5) At least thirty-five transports and forty-five freighters will have to be put into operation to carry out the evacuation in less than two years. The double-S-five cannot under any circumstances be relied upon to make more than one round trip a fortnight. Overhaul on a new model is a large factor expensive in both time and money.

(6) Operating expenses will be roughly doubled since the ships will be carrying a payload only one way.

(7) The evacuation bill: high.

It was the bill which had stopped

the colonel. His eyes kept wandering back to it. He would read, then open up the section on costs again, stare, slap it shut and continue reading. Suddenly he blurted out:

"But according to your figures it would cost more to recondition a double-S-five than it did to build one!"

"Exactly. This isn't 1957, Handy."

"Then build some new ones!"

"The Navy paid thirty million dollars for the *Caspian Sea*. Want to buy a dozen of them?"

"No." The colonel scratched his nose.

"Seriously Handy, how much did you expect to spend on the evacuation?" Srenco was amused.

"Not three hundred million dollars."

"And here I thought you were stuffed with United States funds."

"Three hundred million dollars is money! This is peace, Abe. Ever heard of a colonel spending three hundred million in peace time? The grand Pax Americana! *Phut!*" He growled bitterly.

"But can you raise that money?" asked Srenco urgently.

Tool shrugged, embarrassed. "No."

Srenco said nothing. He just looked at the colonel. Then he chuckled. He was not happy, though.

His favorite delusion had just vaporized. Like in the story about the spaceman who thought he would never die. The spaceman was riding a double-S-

four into Mare Imbrium. He was eighty miles from the Lunar surface and his motors had not yet kicked in. He felt uneasy. So did Srenco.

Srenco had always supposed that if and when space's siege of Citadel became too menacing the four hundred ships in the naval yard offered an escape. In the past week and a half he had become convinced that such a menace existed, that space was about to win her battle, and so he had sided reluctantly with the colonel. Now the colonel turned out to be a poor man in philanthropist clothing.

There was to be no retreat.

Retreat was impossible. Four hundred ships had become worthless because a colonel had no money.

Which did not at all alter the fact that weak Citadel was at the mercy of the merciless.

Olga Pyzel was crouched at a table in the far corner of the Rum House. Drinking made her sleepy. She was sad, too.

Cowards that can't stick it out and fight. Cowards without any nerve. Dirty cowards. How I hate a coward. She conjured up a mental image of Abe Srenco. *Coward! Coward!*

"And what might Olga be muttering about?" The Pirate sat down beside her.

"Cowards," she said without enthusiasm.

Other people glided into the Rum House, bearded men mostly. They

looked at Olga and she looked away. Some nipped bottles clinked together in the "sink." Three men burst into a laugh and Olga mumbled inaudibly about gaiety.

"Lady," said the Pirate, "I got news for you. The big boys just figured out that we're stuck on the Moon. How does that make you feel? Seen Srenco lately?"

• "I'm not on speaking terms with him any more."

"He looks kind of bewildered. I guess anyone would be stunned after losing the kind of contract he just lost."

Olga uncurled a bit. She stared into her nipped glass unemotionally. "So we're staying? Is that what you're telling me?"

"Yeah."

"What is the use of staying with a bunch of cowards like Citadel is full of, eh Pirate? They'll just sit down and get their heads kicked in. You have to fight to stay alive on the Moon. You



got to be a good fighter. You can't moan about hardship. You can't pine away for a safe salt box in New England. You have to fight."

The Pirate grinned across his fat face. Then he moved her glass where she could not reach it. "And Olga is in real good condition to fight now, I'll bet. You're lucky this is the Moon or you'd be flat on your face. Get up. I'm taking you home."

"I'm sleepy," she said.

"Come on, come on." He took her by the arm and propelled her through the Rum House toward the door.

"Why aren't they evacuating us?"

That was a thought. There was nothing stopping the evacuation, really. "We're just an obstinate puddle of ancient flood water stuck on high ground. The levees have been rebuilt. The flood is forgotten and so are we. It is too much trouble to pump us back into the main river channel. That's all. You see? It was inevitable."

"Goody," said Olga sleepily.

"I wouldn't be so happy," said the Pirate. "We're in for bad times. We'd better start milking the suckers on Earth in earnest. You charge the big-heads triple for your unduplicatable photographs and I'll sell the small-heads an aluminum mine in Theophilus. How's that?"

The room had once been a giant communications center. Now it was hardly anything but a ham radio station, though its array of equipment

was quite impressive.

Colonel Tool settled himself at one of the long unused collation desks. He felt irritable. He grumbled when he could not find his pen in the right pocket, grumbled when his pockets produced nothing but an old ball point Skribler—which barely managed to write General Schmidt's address on the standard radio facsimile form before it gave out and had to be replaced by a Number Two pencil borrowed from the radio operator.

Tool wrote, "Dear Smitty," then stared at the radio operator. The operator stared back.

Look some place else, you prize jack-ass. Look at your pretty dials. Mind your own business.

Tool's thoughts were not inclined to favor Citadelians at the present moment. Many had been bitter about his retraction of the evacuation order; some were cracking sharp jokes about it; a big gardener had even threatened to punch his nose if he did not at least get power for the crops that night. The colonel was sour. He wrote:

Dear Smitty:

This is to be considered as a report, if an unofficial one. As far as I am concerned our evacuation plan is totally unfeasible, the cost being in the neighborhood of three hundred million dollars. Nevertheless, Citadel is in bad shape and desperately needs some one's help. I would like you to consider an alternative two-point plan which can probably be carried out for a tenth of the cost of an evacuation.

First: There must be a general reconditioning of the inhabited section of Citadel. A new exchange unit for the reactor being a

priority necessity.

Second: An attempt must be made to put the entire economy of Citadel on a more realistic basis. The Moon has certain unique (if limited) advantages—astronomy, for instance, can virtually become a lunar monopoly. Citadel will cease to be a burden to us only when these intrinsic advantages have been *rigorously* exploited. She can rise above her present substandard living conditions in no other way.

I am not sure such a program will work, but to my mind it is the only answer that fits the economic facts of 1964.

H. D. Tool

P.S. Ain't human critters miserable!

The colonel put the letter aside, then began to write on another "fax" form.

United States Army Hq.
Citadel, Moon
Via Inyokern, California.
June 1964

Naad's Kiddy Shop
Los Angeles, California.

Dear Sirs:

I would appreciate your selecting an outfit for a five year old girl, medium size. It should be of good quality, be BRIGHTLY COLORED, and of simple cut. The design should not be of such a nature as to cause embarrassment to the wearer under conditions of light gravity. Above all it should not *in any respect* resemble an army shirt.

Yours sincerely,

Colonel Hans D. Tool

Mrs. Smith knocked hesitantly on the door of Room Twelve, upper level, with one hand firmly around the wallet in her pocket. She wiggled her big toes nervously.

It was Srenco who opened the door. He had little Diana on his shoulders clinging to his ears. Both of them smiled. They had been having fun

together.

"Well, hello," said Srenco. "Come on in. Looks like my afternoon is turning into a fair sized party."

"Hello, Mrs. Smith," said Diana from her perch.

Mrs. Smith replied, "Hello, little girl." Then she looked at Abe fur- tively. "Hello."

Srenco dumped Diana off his shoulders, grabbed her, and threw her screaming over onto the bed.

"I saw Major Kavam," said Mrs. Smith. "He told me about the evacuation and now my husband tells me there isn't going to be one."

"Yes?"

"What do I do now?"

Srenco shrugged helplessly.

"Is the passenger service really so bad?" she asked plaintively.

"It is."

"That makes me worry more than ever. If nobody can ship a few humans between here and Earth, then what about supplies? Suppose we need something bad? Will the colonel tell us, 'Sorry, it costs too much to get it to you!'" She was trying to be calm and reasonable.

Srenco shook his head. "Colonel Tool is leaving us here because we are cheaper to feed than to evacuate. Live human flesh is a grotesquely uneconomical thing to move between planets, ordinary freight isn't. The transports may stop running. Freighters won't."

"Oh," she said faintly.

At that moment Srenco had to ward off one of Diana's gliding dives at his feet. He flattened her small squealing body against the floor and then pitched her back onto the bed.

Mrs. Smith watched sadly. "What a sad place to bring up a sweet little child," she said.

"You still want to go back to Earth, eh?"

"Oh yes!"

"I'll tell you frankly, Mrs. Smith—you won't make it. Does that strike you hard? I suppose it does. You'll just have to get used to the idea of living here. The people you're with count more than the place, remember that. You have your husband."

Confronted by that stand Mrs. Smith made her last desperate move. If Srenco was not going to offer aid voluntarily, she had the chance of making him offer it. So she pushed her wallet quickly into his hand. "I have to get to Earth," she said stubbornly.

A cynical Srenco counted the bills. Six hundred and seventeen United States dollars. He tossed the full wallet gently back to her. "Buy yourself a coffin," he said. "If that's all you've got, you're *really* buried on the Moon."

Tears welled. "My baby," she sobbed. "I can't have it here, Mr. Srenco. Please, Mr. Srenco!"

Little Diana heard that about the baby. Her ears suddenly became very alert and she stared at Mrs. Smith in awed fascination. Diana had been born among adults. She had never

seen another child in her life. The bed, the room, and Srenco vanished. Tearful Mrs. Smith who was going to have a baby became the only important thing within a thousand kilometers.

"Will it be a boy or a girl?" asked Diana timidly.

Mrs. Smith shook her head.

Then Diana glided over, very worried, and put her arms around the woman's legs in an attempt to comfort a sorrow she could not understand. "Don't worry. I'll take care of your baby. I'll be very good to it. Don't worry about anything."

Mrs. Smith could only twist Diana's hair nervously around her finger.

Diana was worried. "Don't go up to Earth. The wolves or the swordfish will just eat your baby."

"No child," Mrs. Smith said sadly. "I don't suppose the wolves will ever get the chance." She was sulking. "I'll just stay in Citadel and kill myself."

Srenco frowned at that, and poor Diana was frightened.

There was no hurry.

The sun had hours in which to set. It took its own good time. It let the shadows lengthen leisurely. The shadows grew as the sun became a rim, then a spot of fire. The dark shadows merged. Then there was only the pale corona above the bleak horizon of the Imbrium flatland to mark the sun's departure.

The ghost town of the Lunar Alps had again suffered nightfall. But this

particular night did not carry the same fear and sorrow as had its predecessor. There was little power in Citadel but there was promise of power. A new heat exchange unit for the reactor rested in the hold of a freighter waiting out the decay lay-in.

Inside the city the hard life continued much as it always had since the early days of Citadel's independence. The wave of speculation over the "return en masse" had died the usual death of exuberant rumors. Conversation settled down to money and women and space again. People worked and the unemployed began to wait out the long night. Life—as it frequently does among humans—went on.

Olga blocked the door to her apartment. She blinked in the bright lantern light. "I'm not speaking to you any more," she said defiantly.

Srenco glided inside anyway. "Forget that emotional rot," he snapped, setting his lantern on the bare table.

"I'm not speaking to you any more," Olga insisted less strongly.

"You are already speaking to me!"

"Don't shout. Diana is asleep. Why are you coming to see me?"

Srenco seated himself firmly in the aluminum tubing that passed off as a couch and took his time about formulating an answer. "No reason," he said. The light dimmed, then rose showing Olga in its harsh white light. "Why don't you dye that uniform of yours red?"

"Are you trying to make friends

with me again?" she asked.

"Oh—I dunno. Do I look that obvious?"

She sat down in the tubing beside him, stared at his shadowed and unshaven face, and thought kind thoughts about it.

He continued. "I was thinking that us Citadelians should stick together as far as liking each other goes, considering the way intercourse between here and Earth has degenerated. There won't be many new Citadelians for a long time. We ought to get so as we could tolerate each other's stupidities."

"You had a speech all made up for me, Abe, didn't you?" She smiled. "Didn't you?"

"About being friends?"

"Yes."

"I suppose I did," he said.

"Well, you don't have to say it."

He took her shoulder gently in his arm and stared at the bright lantern's mantle.

"How have you been keeping these days?" he asked.

"I've been indignant all week, if that's what you mean."

"How's the observatory?"

"Fine. It is just short of money, that's all. Like it always is. Are you in a lending mood?"

"Nope."

"And what is happening to you?" she asked.

"I've started to work for a living. I'll be able to buy myself some shoes

this Christmas."

"You'd look funny in shoes."

"Probably," he said. "But they give a touch of dignity."

"Then if you are so rich you'll have to lend me some money."

"Nope. I'm not making enough to squander on astronomy. The Navy is bringing its rocket research lab to the Moon since their program is getting too big for Inyokern or White Sands or the Virgin Islands. They need a much bigger, much less populous wasteland. I happen to be in on the deal in only a small way."

"When did that lucky bit of business happen?"

"Colonel Tool got it."

"Him?"

"Don't underestimate Tool, Olga."

"I'm surprised. That is a funny way

for *him* to act. How come he suddenly wants to do something for us?"

"He's caught in a trap, Olga. The United States is too stingy to foot an evacuation bill but too kindhearted to abandon us. So we'll get a certain amount of limited help. And aside from that—for your information—he wants the astronomers to set up the world's most advanced observatory here in Citadel."

"You're kidding me!"

"Nope."

Olga guffawed. "Jokes like that make me happy."

"Wait till something dire happens to us. Suppose your roof starts to break up and gently wafts out into space?"

"I still feel happy."

"You're crazy," said Srenco.

THE END

IN TIMES TO COME

A new author, Jim Brown, takes the lead next issue with a yarn called "The Emmissary." It's about as different in theme, plot, and handling as anything Astounding Science-Fiction's handled in some time. I found it a highly intriguing theme, too—how to make a militaristic totalitarian, absolutism, armed with fleets of interstellar battle cruisers, start playing marbles, forget its colonies, and study better techniques of raising prettier flowers. And do it in less time than it takes said fleets of battle cruisers to take a world apart.

There is a world that's wrapped in fog, and that fog is very important to the whole shemozzle; the degree to which it seeps into the minds of the totalitarian, militaristic authoritarians is also important . . .

Willy Ley has an article in July, too. Meteors are a menace, asteroids are a nuisance, but a comet must be thought of as a full-fledged storm in space. They're peculiar things, and our knowledge of them is a lot less than we'd like. But what we do know of them, Willy discusses . . .

THE EDITOR.

TRANSISTORS

BY J. J. COUPLING

We carried a short discussion of transistors when they were first announced. Since then their size has gotten smaller, their effectiveness greater, and their importance increased vastly. And in a few more years we'll really know something about them!

I think that it's a shame for the men that science-fiction writers don't behave according to cliché. If their faces turned red every time they made a scientific blunder, even the best of them would go around perpetually lit up like a neon sign; they'd be a lot more ornamental as well as more easily identified at ???ventions.

Perhaps an author's feelings suffer even when it doesn't show in his face. To any honest writer, then, I have a few helpful hints to offer in sorting out the present from the remote future. It's a good idea to know what we have now before we invent gadgets for the Twenty-first Century. And I think that some things we have right now may not only astound writers but even mildly interest the

blasé readers of Astounding SCIENCE FICTION.

Isn't this a tempting scene for a space opera: A glancing beam from a G-ray has completely discharged the batteries of the hero's wrist radio. The resourceful character quickly slaps a nickel and a dime—anachronism—on the opposite sides of a spit-wet scrap of paper and reactivates the vital device with this improvised battery. Now, of course, we don't have wrist radios, but we do have transistor oscillators which will run on just such a power source, or on the electric power generated by a photographic exposure meter cell just as well.

Or how about this one? The hero visits a planet where the people are real electronics wizards. They have

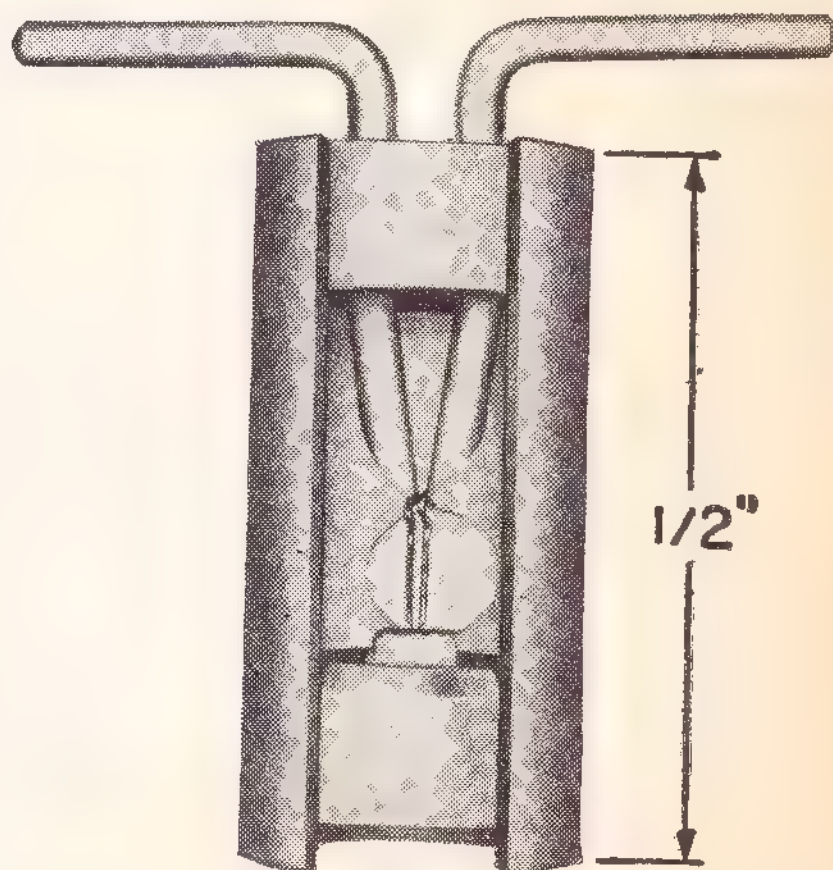
made a thinking machine with practically no components and wiring except thousands and thousands of 6AK5—a miniature size—vacuum tubes. This huge hunk of junk must for some reason, which I will never be able to figure out, be incorporated in the headpiece of an android robot in order to defeat the menacing Paphlagonians. Quickly, the hero whips out plans for something to replace the miniature vacuum tubes. It takes only about 1/250 of the volume, and perhaps more surprising, only about a hundred-thousandth of the power to run. Of course the android is built and the Paphlagonians defeated. Now, as far as I am concerned the android and the Paphlagonians may have to wait for some time, but the transistor prescribed is here.

Another plot might be cooked up: The secret weapon of the enemy falls into our hands. It has lots of circuits which are clearly amplifiers and oscillators, but no vacuum tubes. Instead, there are little pieces of black substance of pinhead size, each with three delicate wires soldered to it. Chemical analysis shows the substance to be germanium. Of course our side makes similar devices immediately, but they show no signs of amplifying. Yet delicate chemical tests and X-ray studies show no apparent nonuniformity in the enemy germanium which works. At the last moment the hero whips out this issue of Astounding and deduces that the

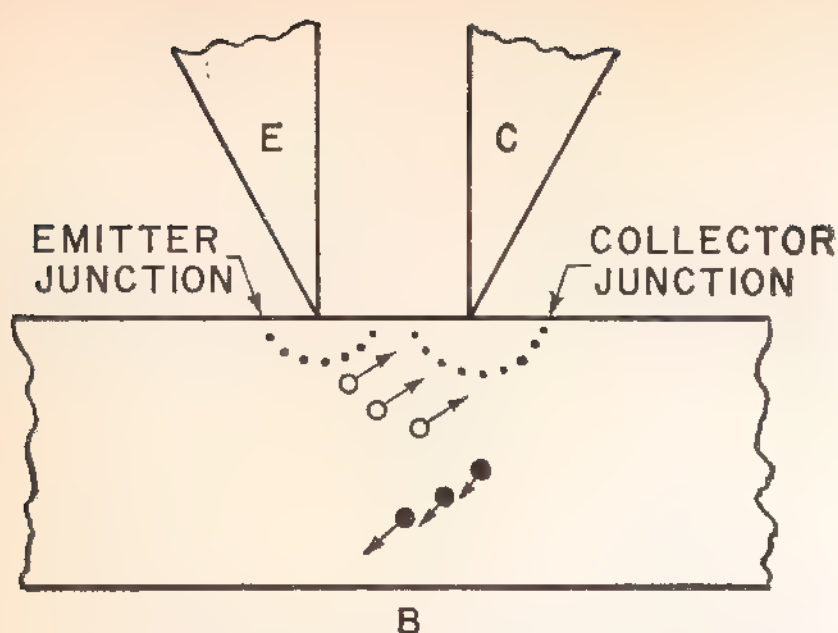
mysterious device is an n-p-n transistor such as they had in 1952.

Authors don't invent miniscule electronic gadgets which oscillate, amplify and perform all the functions of a vacuum tube and yet take almost no space and even less power. And don't try to make such things mysterious by having them featureless blobs of crystal. All that is old stuff. Readers, if that sort of thing interests you, turn from the unimaginative fictioneers right straight around to the technology of today, and hear about transistors.

Transistors were announced publicly about four years ago by the



The Type A transistor consists of a little block of crystalline germanium and two contact points. The "emitter" is held positive; the "collector" is held negative. The collector current is proportional to the emitter current by a factor which may be 10 or higher. The emitter and collector current depend almost entirely on emitter voltage and very little on collector voltage.



N-TYPE POINT CONTACT TRANSISTOR

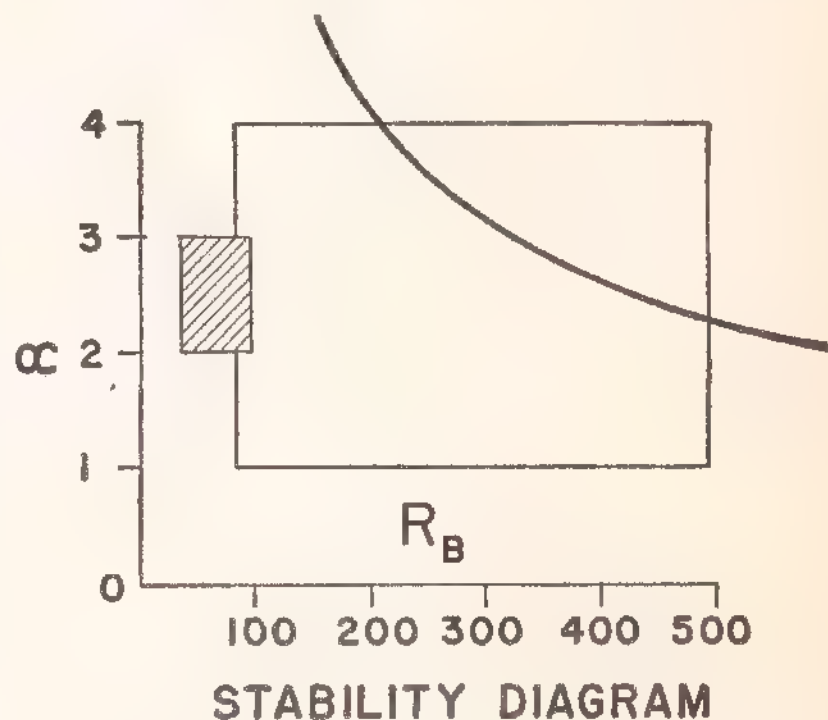
Most of the germanium in the Type A transistor is n type; that is, current is carried through it by negative electrons. This bulk of the material is electrically connected to the cartridge by a large, non-rectifying contact. Surrounding the emitter and collector are regions of p type germanium in which current is carried by positive charged "holes." The negative collector tries to collect holes, but there are none in the n type material except such as are injected into it by the positive emitter. Because the n-type material is conducting, the emitter is shielded from the collector, and hence collector voltage has little effect on emitter current.

Bell Telephone Laboratories. They were invented by J. Bardeen and W. H. Brattain. The research which led to their invention was part of an extensive program carried out under the direction of W. Shockley. The name was suggested by two other solid-state devices, the varistor and the thermistor, and was supplied by an obscure character, J. R. Pierce.

The newspapers greeted the invention of the transistor with very little enthusiasm. It was scarcely mentioned in that paragon, *The New York Times*, which can be stirred only by such phenomena as Velikovsky. There was noticeable uneasiness in the com-

mercial world, for on sound technical advice executives of several firms which make radio tubes had a brief premonition of what will eventually follow. Then the tiny public ripples subsided, and in the following years the commotion which still agitated a group of physicists and a segment of the electronics industry received little notice. Like an iceberg, the bulk of transistor work is still hidden.

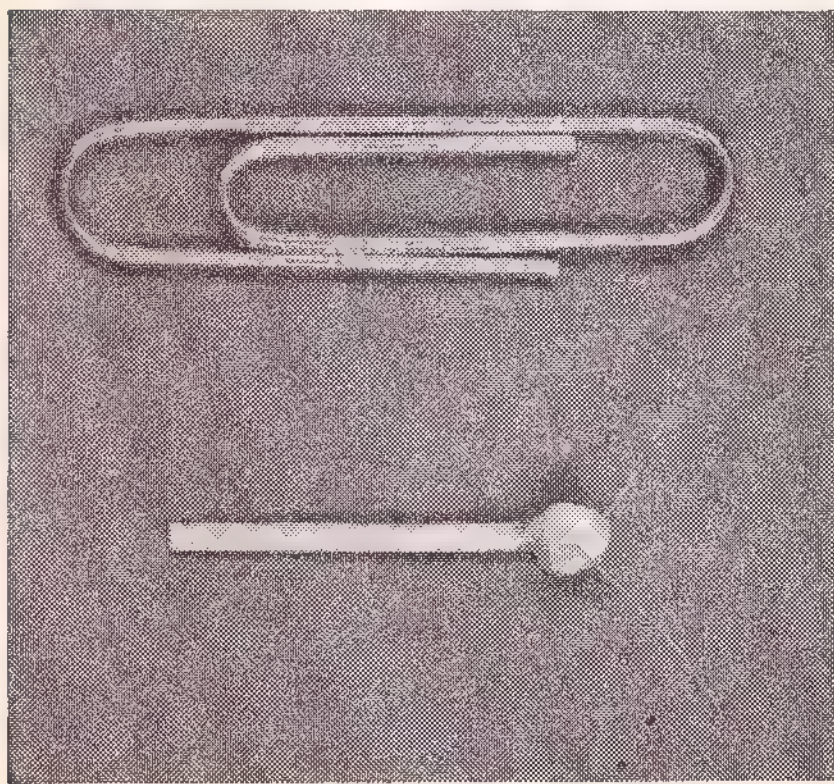
Transistors are too rare and valuable for home radios or television sets. Such as are produced go into military equipment, and production is just getting rolling. But transistors are no longer ticklish experimental devices which work unstably in a single laboratory. They are a product which



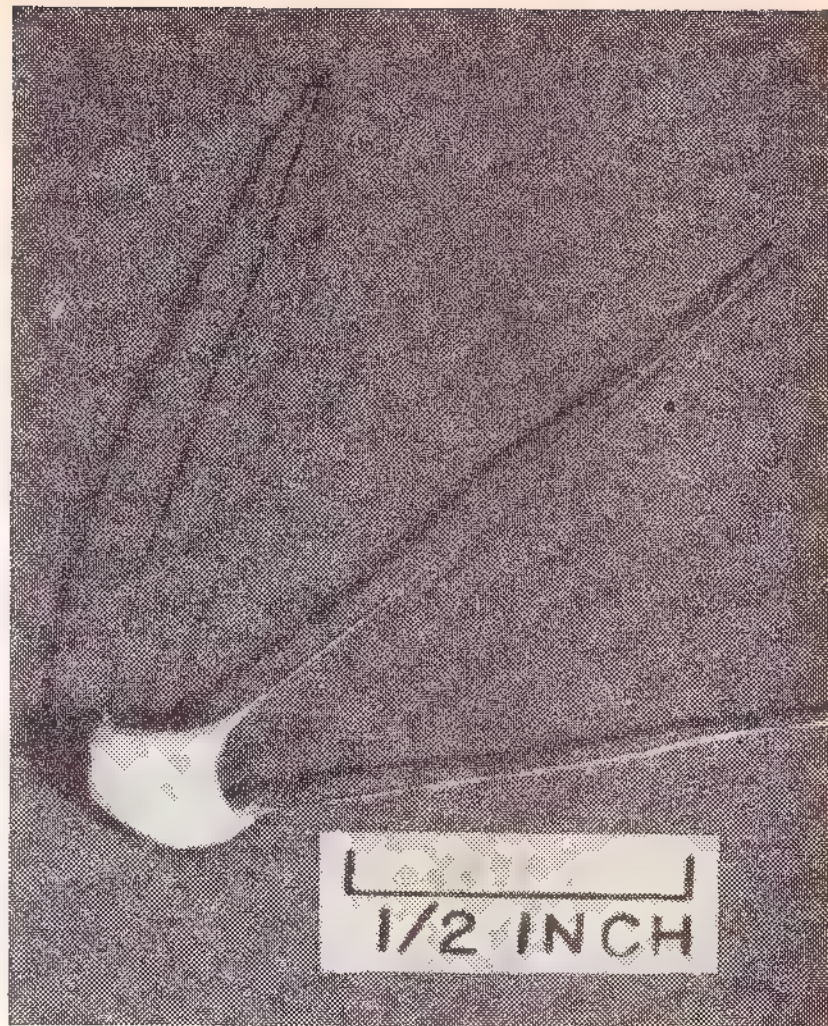
On such a diagram we can plot a point representing a particular transistor. Up is the current multiplication factor alpha and to the right is the base resistance. For early transistors, points representing various transistors fell all over the large rectangle. If the point fell above the curve, the transistor was unstable. Now, points representing all transistors fall in the small, slant-ruled rectangle. Not only are the transistors all stable, but they are much more uniform.

is being developed and manufactured by many companies. If you watch the papers, you will find announcements from many sources which seem to say that the transistor has been invented all over again. Don't be fooled, any more than you would by an author who put the transistor in the Twenty-first Century. The transistor has been here for quite a spell. It's just that executives, advertisers and newspapers are finally coming to believe in it.

What is a transistor like, anyway? The first transistors were what is now known as the Type A. The Type A transistor is a little metal cartridge about the size of a paper clip, with two wires sticking out; the figure will show you what it is like. Inside is a little piece of germanium soldered to a block of metal. Two metal points



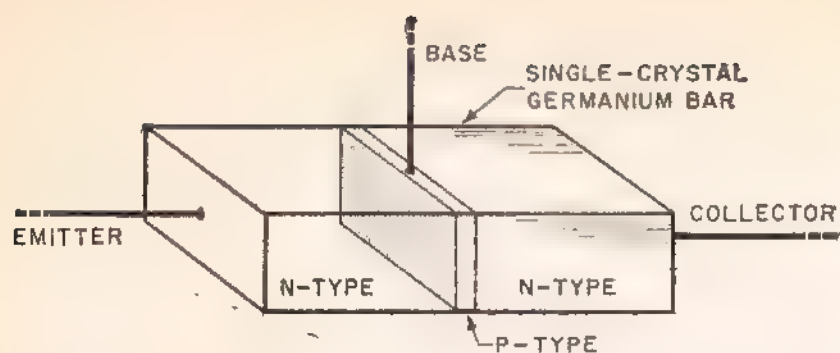
Bead transistor. Here the germanium and the two points are mounted in a tiny plastic bead. The transistor is smaller and more rugged than the Type A.



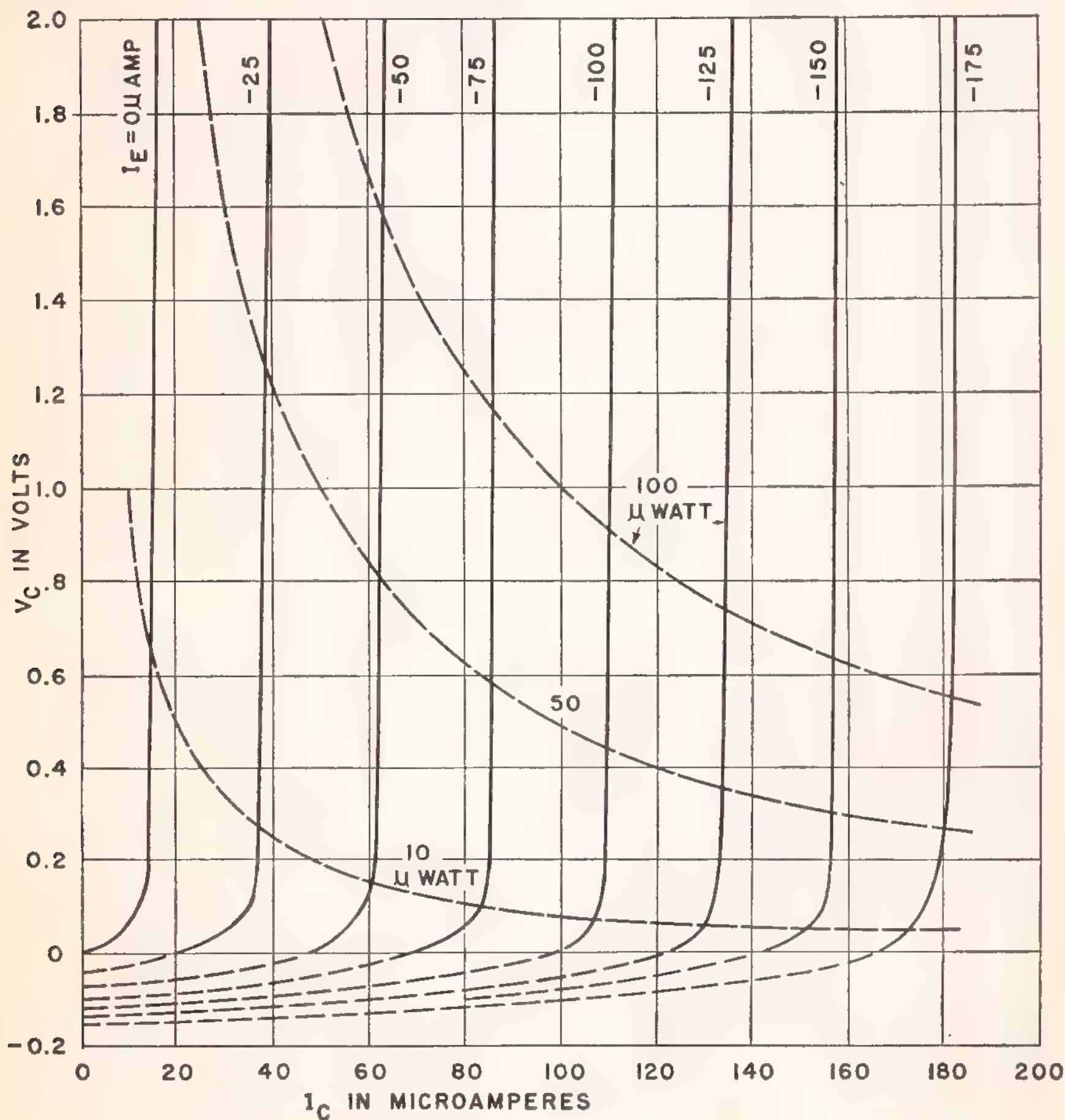
The junction transistor is not only tiny; it can operate on a power of 10 microwatts. Such a power is easily obtained from a battery made of a nickel and a dime separated by damp paper, or from the electricity produced by a photographic exposure meter.

touch the polished surface of the germanium a few thousandths of an inch apart. The whole thing is reminiscent of a crystal detector of the early days of radio, except that there are two cat's whiskers instead of one. Indeed, a transistor would serve as a crystal detector if only one of the wires were used. But with both and a battery, it serves as an amplifier—the only broad-band amplifier which has been invented since the vacuum tube—including the many modern forms of vacuum tubes.

In use, the shell of the transistor is grounded. One of the wires touching



The junction transistor consists of a rod of germanium which is n type at the ends and p type in the middle. Non-rectifying contacts are attached to the three regions.



The amazing characteristics of the junction type transistor. Here collector voltage is plotted against collector current for various emitter currents. Note that the collector current is almost entirely dependent on emitter current down to two tenths of a volt and less than 20 microamperes. The dashed lines are lines of constant power, the lowest being for 10 microwatts.

the cartridge is made positive, and a current flows in this lead. This is the input terminal or the "emitter." The other point is made negative by a few tens of volts. This is the output electrode or "collector." Now the property of the transistor is this: the output current doesn't change much when you change the output voltage. In fact, the output current is almost exactly proportional to the input current, the emitter current. The output current may, however, be ten or more times as great as the emitter current. The emitter current depends almost entirely on emitter voltage, that is, input voltage, and very little on output voltage.

In essence, a very small change in input voltage will produce a large change in emitter current. Since the voltage is small, the input power is small. When the input current is changed, a much larger change in output current occurs. Since the output current is little affected by output voltage, a high impedance output circuit can be used, so that the change in output current causes a large output voltage. The output power, which is the large output voltage times a current larger than the input current, is much larger than the input power, and so the device is an amplifier. Its characteristics are much like those of a tube in a grounded-grid connection, except that there is a current gain.

What accounts for this peculiar

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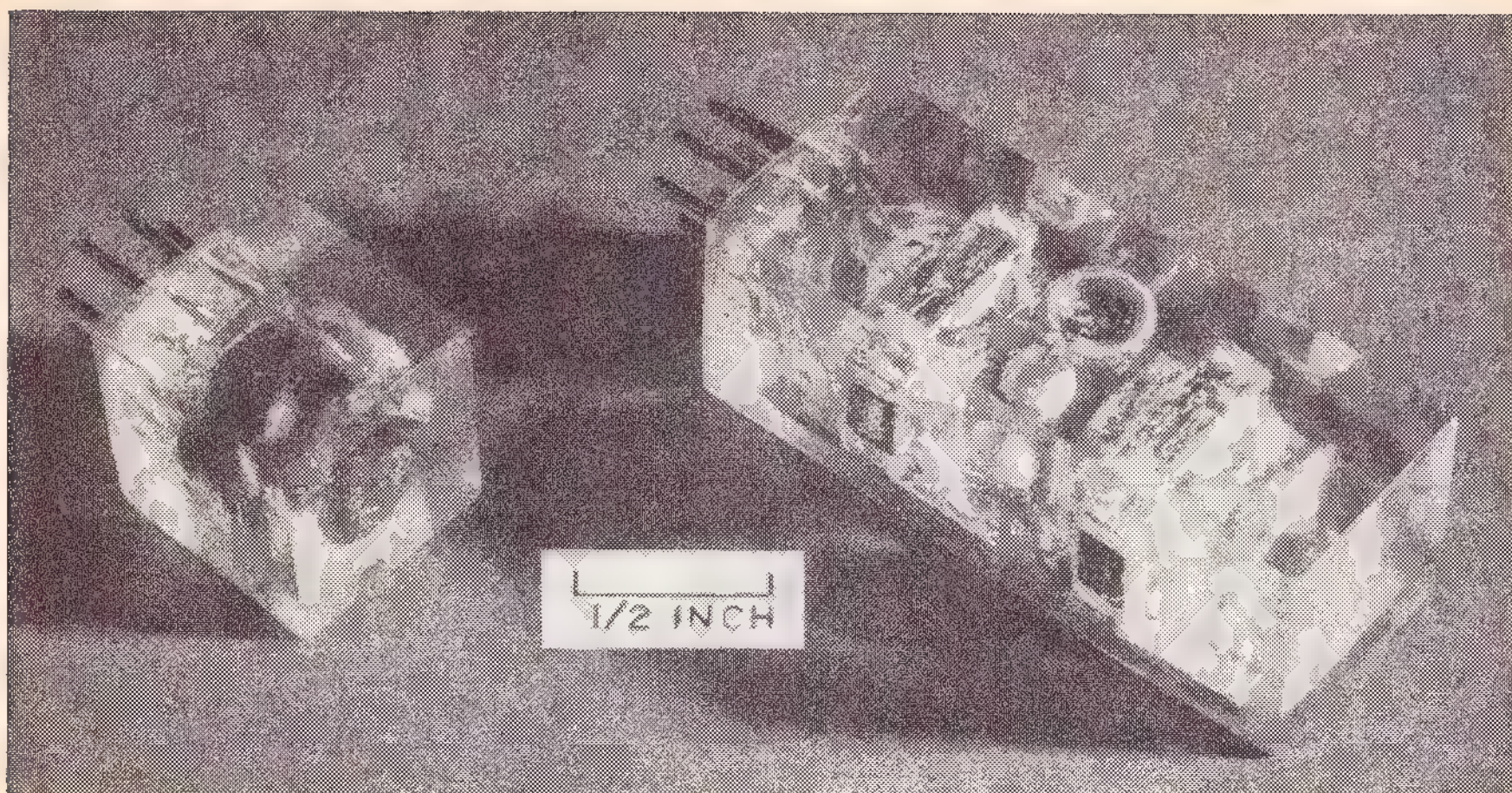


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A packaged oscillator and a packaged amplifier.

behavior? Why doesn't the input current just go to the base of the germanium and through the soldered joint to the mounting cartridge and to ground? Why doesn't the output electrode draw a large current when it is made very negative? To understand these things we have to know a little about the sort of material germanium is, that is, about semiconductors.

We are most used to metals, which conduct electricity, well and in either direction, and insulators, which don't. But there is a third class of materials. Semiconductors conduct electricity, but they conduct electricity less well than metals and very peculiarly. A particular type of semiconductors, to which germanium belongs, and silicon as well, has particularly valuable properties.

When germanium is very pure it is

a very poor conductor even at ordinary temperatures, and when it is very cold, pure germanium is practically an insulator. But ordinary germanium isn't very pure, and it conducts electricity quite well even at ordinary temperatures. But, its conduction is not always the same.

By measurements made in a magnetic field, one can deduce whether conduction is caused by the motion of positive or of negative charges. Indeed, if one measures germanium with a little phosphorus, or arsenic, or antimony as an impurity, he finds that the carriers are negative. Such germanium is called *n* type germanium, after the negative carriers of current.

Measurements on germanium with an impurity of boron, aluminum, gallium or indium give a surprising

result. It appears that the carriers are positive, and such germanium is called *p* type after the positive carriers.

Our first naive notion might be that phosphorus, arsenic and antimony put electrons into germanium, while boron, aluminum, gallium and indium put positive ions into germanium, and that the electrons or positive ions which are put in are free to move around. The truth is much more complicated than this. In a sense, phosphorus does put electrons into germanium; at least it supplies electrons which are free to move around. But what boron does is to extract electrons from a pack of electrons which are already there but are so tightly crowded that they can't move about. The *holes* left by the missing electrons shift about as the remaining electrons move. Since the holes represent a deficit of negative charge, their motion is like the motion of a positive charge, and the test applied to determine the sign of the moving charge gives as an answer, *positive*.

Of course, matters are really much more complicated than these few words imply. Here we have merely to note that quantum theory and experiment agree in saying that certain impurities supply electrons which are free to move through the germanium. When such impurities are present we have *n* type germanium. Other impurities cause germanium to behave

just as if there were free positive charges inside which could move about. When such impurities are present, we have *p* type germanium.

What if some electrons got into *p* type germanium? Could they move about? Yes, for a while, although eventually they would combine with the positive charges—actually, with the holes and disappear. Can holes get into *n* type germanium? Yes, they can, and wander about, though again they will eventually combine with electrons and disappear.

With this knowledge of germanium and with the diagram which accompanies the text we can explain the operation of the Type A transistor.



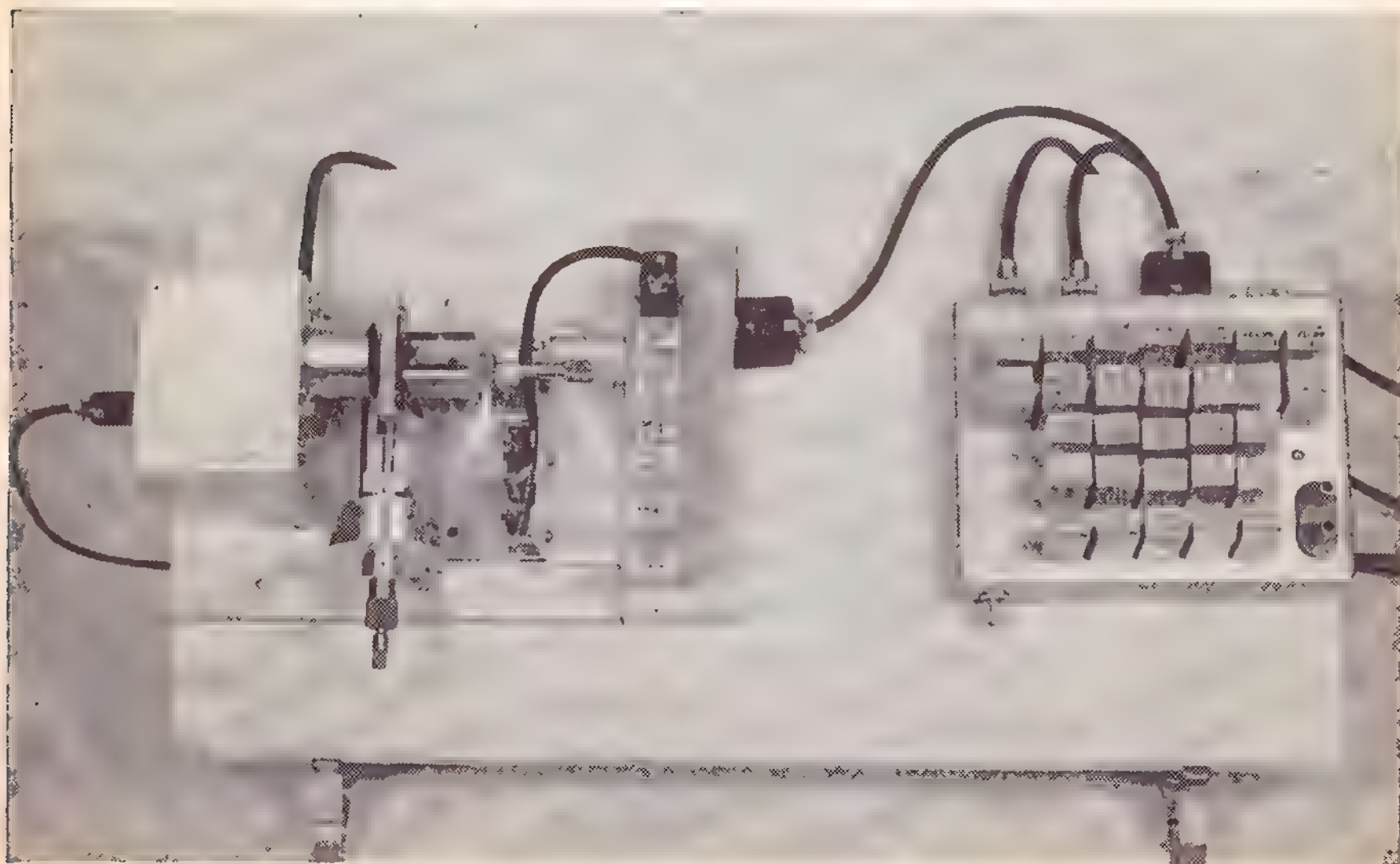
A packaged bit register, which stores one bit or unit of information, together with its socket and a 6AK5 miniature vacuum tube.

The germanium is n type; that is, there are electrons in it which are free to move. However, around the emitter and collector points the germanium has been changed to p type. Thus, near the emitter and collector there are no electrons free to move, but there are positive charges or holes.

The collector is quite negative. Thus, it tends to draw holes from the little region about it, but there is no fresh supply from the n type region between it and the emitter. All it can do is produce a field in the n type region which would tend to whisk a hole to the collector if one appeared.

To get current to the collector one must make the emitter positive. This pushes holes out of the p type region about the emitter into the n type region between emitter and collector. The positive emitter draws electrons into the p type region about the emitter as well. However, holes are denser in the p type region used than are electrons in the intervening n type region, so predominantly the current is carried by holes injected into the n-type region.

Once the holes have been injected into the n type region, they are accelerated by the fields produced by the negative collector and flow to the



Various packaged units assembled into an encoder-translator-register which could be part of a computing system.

collector to form the output current. On their way through the p type region near the output their presence serves to change the electric fields in such a way as to allow electrons to leave the collector, and so the output current is greater than the current of holes flowing to the collector. This current amplification, specified by the Greek letter α (alpha) is an important feature of the Type A transistor.

Explained this way, it all seems simpler than it is. One who has not suffered the pangs of understanding the device in the first place or of properly forming the p type regions about the emitter and the collector may wonder why it wasn't done long ago. This is, of course, a feature of most really good inventions. It is easy enough to make something very complicated, but to make something which is new, and simple, and which works is a truly major achievement.

One may ask, however, what engineers and scientists at the Bell Laboratories have been doing in the last four years. One thing they have been doing is to make 2, and then n —where n is a large number—transistors which are something alike in characteristics. You will find among the illustrations a chart in which the current multiplication factor α is plotted against something called the base resistance, r_b . For us the important feature is that in 1949 points representing the characteristics of transistors which were meant to be the

same fell all over the large rectangle. In 1951 points representing the same type of transistor all fall in the small, diagonally ruled rectangle. Now, there is a little more to this diagram. Points lying above the curved line represent transistors which are unstable—that is, which tend to oscillate. We see that a fair share of the 1949 transistors were just unusable in an amplifier, while all of the 1951 transistors can be used.

Another thing which has been done is to make transistors smaller. You can see from the photograph of the Type A transistor that the active ingredients—the points and the germanium—occupy a small part only of the total bulk. Another photograph shows a fundamentally similar transistor enclosed in a bead of plastic. It is just as good; in fact, it is better, but it is much smaller. And, such transistors will withstand 20,000 g, if the military-minded are interested in acceleration.

Something else still is that the operating characteristics of transistors have been improved, and a variety of transistors have been developed for various uses. The tables below give the story best. "Switching Characteristics" has to do with on-off operation as in digital computers and telephone switching systems. "Photocurrent Ratio" has to do with phototransistors. Yes, a close relative of the point-contact transistor is a sort of

PERFORMANCE PROGRESS

| Performance Figure of Merit | Type A Sept. 1949 | Sept. 1951 | New Development Type |
|-----------------------------------|----------------------|------------|-----------------------------|
| α —Current Gain | 5 x | 50 x | Junction—M1743 |
| Single Stage Class A Gain | 18 db | 22 db | Point—M1729, M1768 |
| | | 45 db | Junction—M1752 |
| Noise Figure at 1000 cps. | 60 db | 45 db | Point—M1768 |
| | | 10 db | Junction—M1752 |
| Frequency Response— fc | 5 mc | 7–10 mc | Point—M1729 |
| | | 20–50 mc | Point—M1734 |
| Class A Power Output | 0.5 watt | 2 watts | Junction |
| Switching Characteristics | None | Good | Point—M1698, M1689 M1734 |
| Feedback Resistance γ^b | 250 ohms | 70 ohms | Point—M1729 |
| Light photocurrent Dark ratio | 2:1 | 20:1 | Junction—M1740 |

photo cell.

Now, in the tables above you will find the word “junction.” This refers to a type of transistor quite different in structure from the Type A. The junction transistor is a little rod of germanium with three fine wires

soldered to it. The illustrations include both a photograph of a junction transistor and a schematic diagram. The little rod of germanium is n type at both ends with a layer of p type in the center. In this case the collector is positive and the emitter negative.

MINIATURIZATION IN SPACE AND POWER DRAIN

| | Type A Sept. 1949 | Sept. 1951 | New Development Types |
|---|--------------------------------|----------------------------------|--------------------------|
| Volume | $\frac{1}{50}$ in ³ | $\frac{1}{2000}$ in ³ | Point—M1689 |
| | | $\frac{1}{500}$ in ³ | Junction—M1752 |
| Minimum Collector Voltage for Class A Operation | 30 v | 2 v | Point—M1768, M1734 |
| | | 0.2 v | Junction—M1752 |
| Minimum Collector Power for Class A Operation | 50 mw | 2 mw | Point—M1768 |
| | | 10 μ W | Junction—M1752 |
| Class A Efficiency | 20% | 35% | Point—M1768, M1729 |
| | | 49% | Junction—M1752 |

The emitter emits electrons rather than holes.

You will note that the second table says that the junction transistor will operate on ten microwatts. This is the transistor which will run from two coins and a dab of spit, or from the electricity produced by a photographic exposure meter. Those skilled in the art will want to know more about its characteristics, and a plot of output voltage versus output current is shown. We see that the current changes very little with output voltage, and therefore depends primarily on emitter current, down below two tenths of a volt. Operation is good

right down to a few microamperes. The dashed lines are voltage multiplied by current, or power to the output electrode. The characteristics are still good along the ten microwatt line.

So much for what transistors are in themselves. But just what are transistors good for, anyway? The first few paragraphs of this article have suggested some of the science fiction uses of transistors. A device which occupies only a few thousandths of the space needed for a vacuum tube and which will run on from a thousandth to a hundred-thousandth of

the power inherently has startling possibilities. What stands between us and Dick Tracy's wrist radio is no longer tiny amplifiers nor their power drain. And electronic computers using transistors should shed less heat and more light on problems.

Before we have wrist radios, tiny low-power electronic computers and robots with transistor brains, much remains to be done.

Then, there are things which transistors won't do, at least, not yet. So far, transistors haven't produced very high powers, while vacuum tubes will give hundreds of kilowatts continuously and peak powers up to ten million watts. Even more seriously, transistors amplify only at comparatively low frequencies, up to a few tens of megacycles. Suppose we allowed for improved transistors all the frequencies below one hundred megacycles. Vacuum tubes still amplify over a total range of frequencies five hundred times as wide. In the field of high powers, high frequencies, and broad bands of frequencies as well, we must rely still on vacuum tubes. It is reasonable to assume that the transistor will not completely replace the vacuum tube, but that rather we will have more and better vacuum tubes as well as more and better transistors in the future.

Despite its limitations, however, the transistor does have unprecedented qualities of smallness, small

power consumption and long life, and it is in the process of working a revolution in amplifying and computing devices at this very moment, as the photographs of transistor circuits indicate.

The most advanced transistor circuits are plug-in devices about the size of smaller vacuum tubes. Each unit contains transistors, resistors, capacitors and perhaps other components, all wired up and encased in plastic. The whole unit has pins and plugs into a miniature tube socket. Some of the units shown are amplifiers and oscillators. Others perform functions appropriate to computer circuits. Thus, one is a bit register, which stores one bit of information. An assembly of many packages to make a larger component of a computing device is also shown.

These packaged units are a preview of the future. Well-advised authors can scarcely go wrong in airily equipping their space stations, robots, personal telephones and whatnot with miniaturized devices of the same sort. Astounding readers have a fine field for armchair inventing and speculating without end. There are headaches, of course, but let them be suffered in private by such men as J. A. Morton, who has been responsible for the development of the transistors and transistor devices described and shown in this article.

THE END



BLOOD BANK

BY WALTER M. MILLER, JR.

A "feral" animal is one which has been domesticated, and has then returned to the wild. They're more dangerous than a mere wild beast; they know and hate men. But a feral civilization . . .

The colonel's secretary heard clomping footsteps in the corridor and looked up from her typing. The footsteps stopped in the doorway. A pair of jet-black eyes bored through her once, then looked away. A tall, thin joker in a space commander's uniform stalked into the reception room, sat in the corner, and folded his hands stiffly in his lap. The secretary arched her plucked brows. It had been six months since a visitor had done that—walked in without saying boo to the girl behind the rail.

"You have an appointment, sir?" she asked with a professional smile.

The man nodded curtly but said nothing. His eyes flickered toward her

briefly, then returned to the wall. She tried to decide whether he was angry or in pain. The black eyes burned with cold fire. She checked the list of appointments. Her smile disappeared, to be replaced by a tight-lipped expression of scorn.

"You're Space Commander Eli Roki?" she asked in an icy tone.

Again the curt nod. She gazed at him steadily for several seconds. "Colonel Beth will see you in a few minutes." Then her typewriter began clattering with sharp sounds of hate.

The man sat quietly, motionlessly. The colonel passed through the reception room once and gave him a brief nod. Two majors came in from the corridor and entered the colonel's office without looking at him. A few moments later, the intercom crackled, "Send Roki in, Dela. Bring your pad and come with him."

The girl looked at Roki, but he was already on his feet, striding toward the door. Evidently he came from an unchivalrous planet; he opened the door without looking at her and let her catch it when it started to slam.

Chubby, elderly Colonel Beth sat waiting behind his desk, flanked by the pair of majors. Roki's bearing as he approached and saluted was that of the professional soldier, trained from birth for the military.

"Sit down, Roki."

The tall space commander sat at attention and waited, his face expres-

sionless, his eyes coolly upon the colonel's forehead. Beth shuffled some papers on his desk, then spoke slowly.

"Before we begin, I want you to understand something, commander."

"Yes, sir."

"You are not being tried. This is not a court-martial. There are no charges against you. Is that clear?"

"Yes, sir."

The colonel's pale eyes managed to look at Roki's face without showing any contempt. "This investigation is for the record, and for the public. The incident has already been investigated, as you know. But the people are aroused, and we have to make a show of some kind."

"I understand, sir."

"Then let's begin. Dela, take notes, please." The colonel glanced at the papers before him. "Space Commander Roki, will you please tell us in your own words what happened during patrol flight Sixty-one on fourday sixmonth, year eighty-seven?"

There was a brief silence. The girl was staring at the back of Roki's neck as if she longed to attack it with a hatchet. Roki's thin face was a waxen mask as he framed his words. His voice came calm as a bell and clear.

"The flight was a random patrol. We blasted off Jod VII at thirteen hours, Universal Patrol Time, switched on the high-C drive, and penetrated to the ten-thousandth level

of the C'th component. We re-entered the continuum on the outer patrol radius at thirty-six degrees theta and two-hundred degrees psi. My navigator threw the dice to select a random course. We were to proceed to a point on the same co-ordinate shell at thirty theta and one-fifty psi. We began—"

The colonel interrupted. "Were you aware at the time that your course would intersect that of the mercy ship?"

The girl looked up again. Roki failed to wince at the question. "I was aware of it, sir."

"Go on."

"We proceeded along the randomly selected course until the warp detectors warned us of a ship. When we came in range, I told the engineer to jockey into a parallel course and to lock the automatics to *keep* us parallel. When that was accomplished, I called the unknown freighter with the standard challenge."

"You saw its insignia?"

"Yes, sir. The yellow mercy star."

"Go on. Did they answer your challenge?"

"Yes, sir. The reply, decoded, was: Mercy liner Sol-G-6, departure Sol III, destination Jod VI, cargo emergency surgibank supplies, Cluster Request A-4-J."

Beth nodded and watched Roki with clinical curiosity. "You knew about the Jod VI disaster? That twenty thousand casualties were waiting in Suspendfreeze lockers for those

supplies?"

"Yes, sir. I'm sorry they died."

"Go on with your account."

"I ordered the navigator to throw the dice again, to determine whether or not the freighter should be boarded for random cargo inspection. He threw a twelve, the yes-number. I called the freighter again, ordered the outer locks opened. It failed to answer, or respond in any way."

"One moment. You explained the reason for boarding? Sol is on the outer rim of the galaxy. It doesn't belong to any cluster system. Primitive place—or regressed. They wouldn't understand our ways."

"I allowed for that, sir," continued the cold-faced Roki. "I explained the situation, even read them extracts of our patrol regs. They failed to acknowledge. I thought perhaps they were out of contact, so I had the message repeated to them by blinker. I know they got it, because the blinker-operator acknowledged the message. Evidently carried it to his superiors. Apparently they told him to ignore us, because when we blinked again, he failed to acknowledge. I then attempted to pull alongside and attach to their hull by magnetic grapples."

"They resisted?"

"Yes, sir. They tried to break away by driving to a higher C-level. Our warp was already at six-thousand C's. The mass-components of our star cluster at that level was just a collapsing gas cloud. Of course, with our

automatic trackers, they just dragged us with them, stalled, and plunged the other way. They pulled us down to the quarter-C level; most of the galaxy was at the red-dwarf stage. I suppose they realized then that they couldn't get away from us like that. They came back to a sensible warp and continued on their previous course."

"And you did what?"

"We warned them by every means of communication at our disposal, read them the standard warning."

"They acknowledge?"

"Once, sir. They came back to say: This is an emergency shipment. We have orders not to stop. We are continuing on course, and will report you to authority upon arrival." Roki paused, eying the colonel doubtfully. "May I make a personal observation, sir?"

Beth nodded tolerantly. "Go ahead."

"They wasted more time dodging about in the C'th component than they would have lost if they had allowed us to board them. I regarded this behavior as highly suspicious."

"Did it occur to you that it might be due to some peculiarity in Sol III's culture? Some stubbornness, or resentment of authority?"

"Yes, sir."

"Did you ask opinions of your crew?"

A slight frown creased Roki's high forehead. "No, sir."

"Why not?"

"Regulation does not require it, sir. My personal reason—the cultural peculiarities of my planet."

The barb struck home. Colonel Beth knew the military culture of Roki's world—Coph IV. Military rank was inherited. On his own planet, Roki was a nobleman and an officer of the war-college. He had been taught to rely upon his own decisions and to expect crisp, quick obedience. The colonel frowned at his desk.

"Let's put it this way: Did you *know* the opinions of the crew?"

"Yes, sir. They thought that we should abandon the pursuit and allow the freighter to continue. I was forced to confine two of them to the brig for insubordination and attempted mutiny." He stopped and glanced at one of the majors. "All due apologies to you, sir."

The major flushed. He ranked Roki, but he had been with the patrol as an observer, and despite his higher rank, he was subject to the ship commander's authority while in space. He had also been tossed in the brig. Now he glared at the Cophian space commander without speaking.

"All right, commander, when they refused to halt, what did you do?"

"I withdrew to a safe range and fired a warning charge ahead of them. It exploded in full view of their scopes, dead ahead. They ignored the warning and tried to flee again."

"Go on."

Roki's shoulders lifted in the suggestion of a shrug. "In accordance with Article Thirty of the Code, I shot them out of space."

The girl made a choking sound. "And over ten thousand people died on Jod VI because you—"

"*That will do, Dela!*" snapped Colonel Beth.

There was a long silence. Roki waited calmly for further questioning. He seemed unaware of the girl's outburst. The colonel's voice came again with a forced softness.

"You examined the debris of the destroyed vessel?"

"Yes, sir."

"What did you find?"

"Fragments of quick-frozen bone, blood plasma, various bodily organs and tissues in cultured or frozen form, prepared for surgical use in transplanting operations; in other words, a complete stock of surgibank supplies, as was anticipated. We gathered up samples, but we had no facilities for preserving what was left."

The colonel drummed his fingers. "You said 'anticipated.' Then you knew full well the nature of the cargo, and you did not suspect contraband material of any kind?"

Roki paused. "I suspected contraband, colonel," he said quietly.

Beth lifted his eyebrows in surprise. "You didn't say that before."

"I was never asked."

"Why didn't you say it anyway?"

"I had no proof."

"Ah, yes," murmured the colonel. "The culture of Coph IV again. Very well, but in examining the debris, you found no evidence of contraband?" The colonel's distasteful expression told the room that he knew the answer, but only wanted it on the record.

But Roki paused a long time. Finally, he said, "No evidence, sir."

"Why do you hesitate?"

"Because I still suspect an illegality—without proof, I'm afraid."

This time, the colonel's personal feelings betrayed him in a snort of disgust. He shuffled his papers for a long time, then looked at the major who had accompanied the patrol. "Will you confirm Roki's testimony, major? Is it essentially truthful, as far as you know?"

The embarrassed officer glared at Roki in undisguised hatred. "For the record, sir—I think the commander behaved disgracefully and insensibly. The results of the stoppage of vitally needed supplies prove—"

"I didn't ask for a moral judgment!" Beth snapped. "I asked you to confirm what he has said here. Were the incidents as he described them?"

The major swallowed hard. "Yes, sir."

The colonel nodded. "Very well. I'll ask your opinions, gentlemen. Was there an infraction of regulations? Did Commander Roki behave as required by Space Code, or did he not?"

Yes or no, please. Major Tuli?"

"No direct infraction, sir, but—"

"No *buts!* Major Go'an?"

"Uh—no infraction, sir."

"I find myself in agreement." The colonel spoke directly at Dela's note pad. "The ultimate results of the incident were disastrous, indeed. And, Roki's action was unfortunate, ill-advised, and not as the Sixty Star Patrol would approve. Laws, codes, regulations are made for men, not men for regulations. Roki observed the letter of the law, but was perhaps forgetful of its spirit. However, no charge can be found against him. This investigating body recommends that he be temporarily grounded without prejudice, and given thorough physical and mental examinations before being returned to duty. That brings us to an end, gentlemen. Dela, you may go."

With another glare at the haughty Cophian, the girl stalked out of the room. Beth leaned back in his chair, while the majors saluted and excused themselves. His eyes kept Roki locked in his chair. When they were alone, Beth said:

"You have anything to say to me off the record?"

Roki nodded. "I can submit my resignation from the patrol through your office, can't I, sir?"

Beth smiled coldly. "I thought you'd do that, Roki." He opened a desk drawer and brought out a single

sheet of paper. "I took the liberty of having it prepared for your signature. Don't misunderstand. I'm not urging you to resign, but we're prepared to accept it if you choose to do so. If you don't like this standard form, you may prepare your own."

The jet-eyed commander took the paper quickly and slashed his name quickly across the bottom. "Is this effective immediately, sir?"

"In this case, we can make it so."

"Thank you, sir."

"Don't regard it as a favor." The colonel witnessed the signature.

The Cophian could not be stung. "May I go now?"

Beth looked up, noticing with amusement that Roki—now a civilian—had suddenly dropped the "sir." And his eyes were no longer cold. They were angry, hurt, despairing.

"What makes you Cophians tick anyway?" he murmured thoughtfully.

Roki stood up. "I don't care to discuss it with you, colonel. I'll be going now."

"Wait, Roki." Beth frowned ominously to cover whatever he felt.

"I'm waiting."

"Up until this incident, I liked you, Roki. In fact, I told the general that you were the most promising young officer in my force."

"Kind of you," he replied tonelessly.

"And you could have been sitting at this desk, in a few years. You

hoped to, I believe."

A curt nod, and a quick glance at Beth's shoulder insignia.

"You chose your career, and now you don't have it. I know what it means to you."

A tightening of the Cophian's jaw told the colonel that he wanted no sympathy, but Beth continued.

"Since this is the oldest, most established, most static planet in the Cluster, you're out of a job in a place where there's no work."

"That's none of your business, colonel," Roki said quietly.

"According to my culture's ethics it *is* my business," he bellowed. "Of course you Cophians think differently. But we're not quite so cold. Now you listen: I'm prepared to help you a little, although you're probably too pig-headed to accept. God knows, you don't deserve it anyway."

"Go on."

"I'm prepared to have a patrol ship take you to any planet in the galaxy. Name it, and we'll take you there." He paused. "All right, go ahead and refuse. Then get out."

Roki's thin face twitched for a moment. Then he nodded. "I'll accept. Take me to Sol III."

The colonel got his breath again slowly. He reddened and chewed his lip. "I did say galaxy, didn't I? I meant . . . well . . . you know we can't send a military ship outside the Sixty-Star Cluster."

Roki waited impassively, his dark eyes measuring the colonel.

"Why do you want to go *there*?"

"Personal reasons."

"Connected with the mercy ship incident?"

"The investigation is over."

Beth pounded his desk. "It's crazy, man! Nobody's been to Sol for a thousand years. No reason to go. Sloppy, decadent place. I never suspected *they'd* answer Jod VI's plea for surgical supplies!"

"Why not? They were *selling* them."

"Of course. But I doubted that Sol still had ships, especially C-drive ships. Only contribution Sol ever made to the galaxy was to spawn the race of Man—if you believe that story. It's way out of contact with any interstellar nation. I just don't get it."

"Then you restrict your offer, colonel?" Roki's eyes mocked him.

Beth sighed. "No, no—I *said* it. I'll do it. But I can't send a patrol ship that far. I'll have to pay your way on a private vessel. We can find some excuse—exploration maybe."

Roki's eyes flickered sardonically. "Why not send a diplomatic delegation—to apologize to Sol for the blasting of their mercy ship."

"Uk! With *YOU* aboard?"

"Certainly. They won't know me."

Beth just stared at Roki as if he were of a strange species.

"You'll do it?" urged Roki.

"I'll think it over. I'll see that you get there, if you insist on going. Now

get out of here. I've had enough of you, Roki."

The Cophian was not offended. He turned on his heel and left the office. The girl looked up from her filing cabinets as he came out. She darted ahead of him and blocked the doorway with her small tense body. Her face was a white mask of disgust, and she spoke between her teeth.

"How does it feel to murder ten thousand people and get away with it?" she hissed.

Roki looked at her face more closely and saw the racial characteristics of Jod VI—the slightly oversized irises of her yellow brown eyes, the thin nose with flaring nostrils, the pointed jaw. Evidently some of her relatives had died in the disaster and she held him personally responsible. He had destroyed the help that was on its way to casualties.

"How does it feel?" she demanded, her voice going higher, and her hands clenching into weapons.

"Would you step aside please, Miss?"

A quick hand slashed out to rake his cheek with sharp nails. Pain seared his face. He did not move. Two bright stripes of blood appeared from his eye to the corner of his mouth. A drop trickled to the point of his chin and splattered down upon the girl's shoe.

"On my planet," he said, in a not unkindly tone, "when a woman insists on behaving like an animal, we assist her—by having her flogged

naked in the public square. I see personal dignity is not so highly prized here. You do not regard it as a crime to behave like an alley cat?"

Her breath gushed out of her in a sound of rage, and she tore at the wounds again. Then, when he did nothing but look at her coldly, she fled.

Eli Roki, born to the nobility of Coph, dedicated to the service of the Sixty-Star Cluster, suddenly found himself something of an outcast. As he strode down the corridor away from Beth's office, he seemed to be walking into a thickening fog of desolation. He had no home now; for he had abdicated his hereditary rights on Coph in order to accept a commission with the SSC Patrol. That, too, was gone; and with it, his career.

He had known from the moment he pressed the firing stud to blast the mercy freighter that unless the freighter proved to be a smuggler, his career would be forfeit. He was still morally certain that he had made no mistake. Had the freighter been carrying any other cargo, he would have been disciplined for *not* blasting it. And, if they had had nothing to hide, they would have stopped for inspection. Somewhere among Sol's planets lay the answer to the question—"What else was aboard besides the cargo of mercy?"

Roki shivered and stiffened his shoulders as he rode homeward in a



heliocab. If the answer to the question were "nothing," then according to the code of his planet, there was only one course left to follow. "The Sword of Apology" it was called.

He waited in his quarters for the colonel to fulfill his promise. On the following day, Beth called.

"I've found a Dalethian ship, Roki.

Privately owned. Pilot's willing to fly you out of the Cluster. It's going as an observation mission—gather data on the Sol System. The commissioners vetoed the idea of sending a diplomatic delegation until we try to contact Solarians by high-C radio."

"When do I leave?"

"Be at the spaceport tonight. And good luck, son. I'm sorry all this happened, and I hope—"

"Yeah, thanks."

"Well—"

"Well?"

The colonel grunted and hung up. Ex-Commander Roki gathered up his uniforms and went looking for a pawn shop. "Hock 'em, or sell 'em?" asked a bald man behind the counter. Then he peered more closely at Roki's face, and paused to glance at a picture on the front page of the paper. "Oh," he grunted, "you. You wanta sell 'em." With a slight sneer, he pulled two bills from his pocket and slapped them on the counter with a contemptuous take-it-or-leave-it stare. The clothing was worth at least twice as much. Roki took it after a moment's hesitation. The money just matched the price tag on a sleek, snub-nosed Multin automatic that lay in the display case.

"And three hundred rounds of ammunition," he said quietly as he pocketed the weapon.

The dealer sniffed. "It only takes one shot, bud—for what *you* need to do."

Roki thanked him for the advice and took his three hundred rounds.

He arrived at the spaceport before his pilot, and went out to inspect the small Dalethian freighter that would bear him to the rim of the galaxy. His face clouded as he saw the pitted hull and the glaze of fusion around the lips of the jet tubes. Some of the ground personnel had left a Geiger hanging on the stern, to warn wanderers to keep away. Its dial indicator was fluttering in the red. He carried it into the ship. The needle dropped to a safe reading in the control cabin, but there were dangerous spots in the reactor room. Angrily he went to look over the controls.

His irritation grew. The ship—aptly named the *Idiot*—was of ancient vintage, without the standard warning systems or safety devices, and with no armament other than its ion guns. The fifth dial of its position-indicator was calibrated only to one hundred thousand C's, and was red-lined at ninety thousand. A modern service-ship, on the other hand, could have penetrated to a segment of five-space where light's velocity was constant at one hundred fifty thousand C's and could reach Sol in two months. The *Idiot* would need five or six, if it could make the trip at all. Roki doubted it. Under normal circumstances, he would hesitate to use the vessel even within the volume of the Sixty-Star Cluster.

He thought of protesting to Beth,

but realized that the colonel had fulfilled his promise, and would do nothing more. Grumbling, he stowed his gear in the cargo hold, and settled down in the control room to doze in wait for the pilot.

A sharp whack across the soles of his boots brought him painfully awake. "Get your feet off the controls!" snapped an angry voice.

Roki winced and blinked at a narrow frowning face with a cigar clenched in its teeth. "And get out of that chair!" the face growled around its cigar.

His feet stung with pain. He hissed a snarl and bounded to his feet; grabbing a handful of the intruder's shirt-front, he aimed a punch at the cigar—then stayed the fist in midair. Something felt wrong about the shirt. Aghast, he realized there was a woman inside it. He let go and reddened. "I . . . I thought you were the pilot."

She eyed him contemptuously as she tucked in her shirt. "I am, Doc." She tossed her hat on the navigation desk, revealing a close-cropped head of dark hair. She removed the cigar from her face, neatly pinched out the fire, and filed the butt in the pocket of her dungarees for a rainy day. She had a nice mouth, with the cigar gone, but it was tight with anger.

"Stay out of my seat," she told him crisply, "and out of my hair. Let's get that straight before we start."

"This . . . this is *your* tub?" he gasped.

She stalked to a panel and began punching settings into the courser. "That's right. I'm Daleth Shipping Incorporated. Any comments?"

"You expect this wreck to make it to Sol?" he growled.

She snapped him a sharp, green-eyed glance. "Well listen to the free-ride! Make your complaints to the colonel, fellow. I don't expect anything, except my pay. I'm willing to chance it. Why shouldn't you?"

"The existence of a fool is not necessarily a proof of the existence of two fools," he said sourly.

"If you don't like it, go elsewhere." She straightened and swept him with a clinical glance. "But as I understand it, *you* can't be too particular."

He frowned. "Are you planning to make *that* your business?"

"Uh-uh! You're nothing to me, fellow. I don't care *who* I haul, as long as it's legal. Now do you want a ride, or don't you?"

He nodded curtly and stalked back to find quarters. "Stay outa my cabin," she bellowed after him.

Roki grunted disgustedly. The pilot was typical of Daleth civilization. It was still a rough, uncouth planet with a thinly scattered population, a wild frontier, and growing pains. The girl was the product of a wildly expanding, tough fisted culture with little respect for authority. It occurred to him immediately that she might be

thinking of selling him to the Solarian officials—as the man who blasted the mercy ship.

“Prepare to lift,” came the voice of the intercom. “Two minutes before blast-off.”

Roki suppressed an urge to scramble out of the ship and call the whole thing off. The rockets belched, coughed, and then hissed faintly, idling in wait for a command. Roki stretched out on his bunk, for some of these older ships were rather rough on blast-off. The hiss became a thunder, and the *Idiot* moved skyward—first slowly, then with a spurt of speed. When it cleared the atmosphere, there was a sudden lurch as it shed the now-empty booster burners. There was a moment of dead silence, as the ship hovered without power. Then the faint shriek of the ion streams came to his ears—as the ion drive became useful in the vacuum of space. He glanced out the port to watch the faint streak of luminescence focus into a slender needle of high-speed particles, pushing the *Idiot* ever higher in a rush of acceleration.

He punched the intercom button. “Not bad, for a Dalethian,” he called admiringly.

“Keep your opinions to yourself,” growled Daleth Incorporated.

The penetration to higher C-levels came without subjective sensation. Roki knew it was happening when the purr from the reactor room went deep-

throated and when the cabin lights went dimmer. He stared calmly out the port, for the phenomenon of penetration never ceased to thrill him.

The transition to high-C began as a blue-shift in the starlight. Distant, dull-red stars came slowly brighter, whiter—until they burned like myriad welding arcs in the black vault. They were not identical with the stars of the home continuum, but rather, projections of the same star-masses at higher C-levels of five-space, where the velocity of light was gradually increasing as the *Idiot* climbed higher in the C-component.

At last he had to close the port, for the starlight was becoming unbearable as its wave-length moved into the ultraviolet and the X-ray bands. He watched on a fluorescent viewing screen. The projective star-masses were flaring into supernovae, and the changing continuums seemed to be collapsing toward the ship in the blue-shift of the cosmos. As the radiant energy increased, the cabin became warmer, and the pilot set up a partial radiation screen.

At last the penetration stopped. Roki punched the intercom again. “What level are we on, Daleth?”

“Ninety thousand,” she replied curtly.

Roki made a wry mouth. She had pushed it up to the red line without a blink. It was O.K.—if the radiation screens held out. If they failed to hold it, the ship would be blistered into a

drifting dust cloud.

"Want me to navigate for you?" he called.

"I'm capable of handling my own ship," she barked.

"I'm aware of that. But I have nothing else to do. You might as well put me to work."

She paused, then softened a little. "O.K., come on forward."

She swung around in her chair as he entered the cabin, and for the first time he noticed that, despite the close-cropped hair and the dungarees and the cigar-smoking, she was quite a handsome girl—handsome, proud, and highly capable. Daleth, the frontier planet, bred a healthy if somewhat unscrupulous species.

"The C-maps are in that case," she said, jerking her thumb toward a filing cabinet. "Work out a course for maximum radiant thrust."

Roki frowned. "Why not a least-time course?"

She shook her head. "My reactors aren't too efficient. We need all the boost we can get from external energy. Otherwise we'll have to dive back down for fuel."

Worse and worse!—Roki thought as he dragged out the C-maps. Flying this boat to Sol would have been a feat of daring two centuries ago. Now, in an age of finer ships, it was a feat of idiocy.

Half an hour later, he handed her a course plan that would allow the

Idiot to derive about half of its thrust from the variations in radiation pressure from the roaring inferno of the high-level cosmos. She looked it over without change of expression, then glanced at him curiously, after noting the time.

"You're pretty quick," she said.

"Thank you."

"You're hardly stupid. Why did you pull such a stupid boner?"

Roki stiffened. "I thought you planned to regard that as none of your business."

She shrugged and began punching course-settings into the courser. "Sorry, I forgot."

Still angry, he said, "I don't regard it as a boner. I'd do it again."

She shrugged again and pretended a lack of interest.

"Space-smuggling could be the death of the galaxy," he went on. "That's been proven. A billion people once died on Tau II because somebody smuggled in a load of non-Tauian animals—for house pets. I did only what history has proven best."

"I'm trying to mind my own business," she growled, eyeing him sourly.

Roki fell silent and watched her reshape the radiation screen to catch a maximum of force from the flare of energy that blazed behind them. Roki was not sure that he wanted her to mind her own business. They would have to bear each other's presence for several months, and it would be nice to know how things stood.

"So you think it was a stupid boner," he continued at last. "So does everyone else. It hasn't been very pleasant."

She snorted scornfully as she worked. "Where I come from, we don't condemn fools. We don't need to. They just don't live very long, not on Daleth."

"And I am a fool, by your code?"

"How should I know? If you live to a ripe old age and get what you want, you probably aren't a fool."

And *that*, thought Roki, was the Dalethian golden rule. If the universe lets you live, then you're doing all right. And there was truth in it, perhaps. Man was born with only one right—the right to a chance at proving his fitness. And that right was the foundation of every culture, even though most civilized worlds tried to define "fitness" in terms of cultural values. Where life was rough, it was rated in terms of survival.

"I really don't mind talking about it," he said with some embarrassment. "I have nothing to hide."

"That's nice."

"Do you have a name—other than your firm name?"

"As far as you're concerned, I'm Daleth Incorporated." She gave him a suspicious look that lingered a while and became contemplative. "There's only one thing I'm curious about—why are you going to Sol?"

He smiled wryly. "If I told a Dalethian that, she would indeed think

me a fool."

Slowly the girl nodded. "I see. I know of Cophian ethics. If an officer's blunder results in someone's death, he either proves that it was not a blunder or he cuts his throat—ceremonially, I believe. Will you do that?"

Roki shrugged. He had been away from Coph a long time. He didn't know.

"A stupid custom," she said.

"It manages to drain off the fools, doesn't it? It's better than having society try them and execute them forcibly for their crimes. On Coph, a man doesn't need to be afraid of society. He needs only to be afraid of his own weakness. Society's function is to protect individuals against unfortunate accidents, but not against their own blunders. And when a man blunders, Coph simply excludes him from the protectorate. As an outcast, he sacrifices himself. It's not too bad a system."

"You can have it."

"Dalethian?"

"Yeah?"

"You have no personal anger against what I did?"

She frowned at him contemptuously. "Uh-uh! I judge no one. I judge no one unless I'm personally involved. Why are you worried about what others think?"

"In our more highly developed society," he said stiffly, "a man inevitably grows a set of thinking-habits called 'conscience.'"

"Oh—yeah." Her dull tone indicated a complete lack of interest.

Again Roki wondered if she would think of making a quick bit of cash by informing Solarian officials of his identity. He began a mental search for a plan to avoid such possible treachery.

They ate and slept by the ship's clock. On the tenth day, Roki noticed a deviation in the readings of the radiation-screen instruments. The shape of the screen shell was gradually trying to drift toward minimum torsion, and assume a spherical shape. He pointed it out to Daleth, and she quickly made the necessary readjustments. But the output of the reactors crept a notch higher as a result of the added drain. Roki wore an apprehensive frown as the flight progressed.

Two days later, the screen began creeping again. Once more the additional power was applied. And the reactor output needle hung in the yellow band of warning. The field-generators were groaning and shivering with threatening overload. Roki worked furiously to locate the trouble, and at last he found it. He returned to the control cabin in a cold fury.

"Did you have this ship pre-flighted before blast-off?" he demanded.

Her mouth fluttered with amusement as she watched his anger. "Certainly, commander."

He flushed at the worthless title. "May I see the papers?"

For a moment she hesitated, then fumbled in her pocket and displayed a folded pink paper.

"Pink!" he roared. "You had no business taking off!"

Haughtily, she read him the first line of the pre-flight report. "'Base personnel disclaim any responsibility for accidents resulting from flight of Daleth Ship—' It doesn't say I can't take off."

"I'll see you banned from space!" he growled.

She gave him a look that reminded him of his current status. It was a tolerant, amused stare. "What's wrong, commander?"

"The synchronizers are out, that's all," he fumed. "Screen's getting farther and farther from resonance."

"So?"

"So the overload'll get worse, and the screen'll break down. You'll have to drop back down out of the C-component and get it repaired."

She shook her head. "We'll chance it like it is. I've always wanted to find out how much overload the reactor'll take."

Roki choked. There wasn't a chance of making it. "Are you a graduate space engineer?" he asked.

"No."

"Then you'd better take one's advice."

"Yours?"

"Yes."

"No! We're going on."

"Suppose I refuse to let you?"

She whirled quickly, eyes flashing. "I'm in command of my ship. I'm also armed. I suggest you return to your quarters, passenger."

Roki sized up the situation, measured the determination in the girl's eyes, and decided that there was only one thing to do. He shrugged and looked away, as if admitting her authority. She glared at him for a moment, but did not press her demand that he leave the control room. As soon as she glanced back at the instruments, Roki padded his rough-knuckles with a handkerchief, selected a target at the back of her short crop of dark hair, and removed her objections with a short chopping blow to the head. "Sorry, friend," he murmured as he lifted her limp body out of the seat.

He carried her to her quarters and placed her on the bunk. After removing a small needle gun from her pocket, he left a box of headache tablets in easy reach, locked her inside, and went back to the controls. His fist was numb, and he felt like a heel, but there was no use arguing with a Dalethian. Clubbing her to sleep was the only way to avoid bloodier mayhem in which she might have emerged the victor—until the screen gave way.

The power-indication was threateningly high as Roki activated the C-drive and began piloting the ship downward through the fifth component. But with proper adjustments,

he made the process analogous to free-fall, and the power-reading fell off slowly. A glance at the C-maps told him that the *Idiot* would emerge far beyond the limits of Sixty-Star Cluster. When it re-entered the continuum, it would be in the general volume of space controlled by another interstellar organization called The Viggern Federation. He knew little of its culture, but certainly it should have facilities for repairing a set of screen-synchronizers. He looked up its capitol planet, and began jetting toward it while the ship drifted downward in C. As he reached lower energy-levels, he cut out the screen altogether and went to look in on Daleth Incorporated who had made no sound for two hours.

He was surprised to see her awake and sitting up on the bunk. She gave him a cold and deadly stare, but displayed no rage. "I should've known better than to turn my back on you."

"Sorry. You were going to—"

"Save it. Where are we?"

"Coming in on Tragor III."

"I'll have you jailed on Tragor III, then."

He nodded. "You *could* do that, but then you might have trouble collecting my fare from Beth."

"That's all right."

"Suit yourself. I'd rather be jailed on your trumped-up charges than be a wisp of gas at ninety-thousand C's."

"Trumped up?"

"Sure, the pink pre-flight. Any

court will say that whatever happened was your own fault. You lose your authority if you fly pink, unless your crew signs a release."

"You a lawyer?"

"I've had a few courses in space law. But if you don't believe me, check with the Interfed Service on Trakor III."

"I will. Now how about opening the door. I want out."

"Behave?"

She paused, then: "My promise wouldn't mean anything, Roki. I don't share your system of ethics."

He watched her cool green eyes for a moment, then chuckled. "In a sense you *do*—or you wouldn't have said *that*." He unlocked the cabin and released her, not trusting her, but realizing that the synchronizers were so bad by now that she couldn't attempt to go on without repairs. She could have no motive for turning on him—except anger perhaps.

"My gun?" she said.

Again Roki hesitated. Then, smiling faintly, he handed it to her. She took the weapon, sniffed scornfully, and cocked it. "Turn around, fool!" she barked.

Roki folded his arms across his chest, and remained facing her. "Go to the devil," he said quietly.

Her fingers whitened on the trigger. Still the Cophian failed to flinch, lose his smile, or move. Daleth Incorporated arched her eyebrows, uncocked the pistol, and returned it to

her belt. Then she patted his cheek and chuckled nastily. "Just watch yourself, commander. I don't like you."

And he noticed, as she turned away, that she had a bump on her head to prove it. He wondered how much the bump would cost him before it was over. Treachery on Sol, perhaps.

The pilot called Trakor III and received instructions to set an orbital course to await inspection. All foreign ships were boarded before being permitted to land. A few hours later, a small patrol ship winged close and grappled to the hull. Roki went to manipulate the locks.

A captain and two assistants came through. The inspector was a young man with glasses and oversized ears. His eyebrows were ridiculously bushy and extended down on each side to his cheekbones. The ears were also filled with yellow brush. Roki recognized the peculiarities as local evolutionary tendencies; for they were shared also by the assistants. Trakor III evidently had an exceedingly dusty atmosphere.

The captain nodded a greeting and requested the ship's flight papers. He glanced at the pink pre-flight, clucked to himself, and read every word in the dispatcher's forms. "Observation flight? To Sol?" He addressed himself to Roki, using the interstellar Esperanto.

The girl answered. "That's right.

Let's get this over with."

The captain gave her a searing, head-to-toe glance. "Are you the ship's owner, woman?"

Daleth Incorporated contained her anger with an effort. "I am."

The captain told her what a Tragorian thought of it by turning aside from her, and continuing to address Roki as if he were ship's skipper. "Please leave the ship while we fumigate and inspect. Wohr will make you comfortable in the patrol vessel. You will have to submit to physical examination—a contagion precaution."

Roki nodded, and they started out after the assistant. As they entered the corridor, he grinned at Daleth, and received a savage kick in the shin for his trouble.

"Oops, sorry!" she muttered.

"Oh—one moment, sir," the captain called after them. "May I speak to you a moment—"

They both stopped and turned.

"Privately," the captain added.

The girl marched angrily on. Roki stepped back in the cabin and nodded.

"You are a well-traveled man, E Roki?" the bushy-browed man asked politely.

"Space has been my business."

"Then you need no warning about local customs." The captain bowed.

"I know enough to respect them and conform to them," Roki assured him. "That's a general rule. But I'm not familiar with Tragor III. Is there anything special I should

know before we start out?"

"Your woman, E Roki. You might do well to inform her that she will have to wear a veil, speak to no man, and be escorted upon the streets at all times. Otherwise, she will be wise to remain on the ship, in her quarters."

Roki suppressed a grin. "I shall try to insure her good behavior."

The captain looked defensive. "You regard our customs as primitive?"

"Every society to its own tastes, captain. The wisdom of one society would be folly for another. Who is qualified to judge? Only the universe, which passes the judgment of survival on all peoples."

"Thank you. You are a wise traveler. I might explain that our purdah is the result of an evolutionary peculiarity. You will see for yourself, however."

"I can't *guarantee* my companion's behavior," Roki said before he went to join Daleth. "But I'll try my best to influence her."

Roki was grinning broadly as he went to the patrol vessel to wait. One thing was certain: the girl would have a rough time on Tragor if she tried to have him jailed for mutiny.

Her face reddened to forge-heat as he relayed the captain's warning.

"I shall do nothing of the sort," she said stiffly.

Roki shrugged. "You know enough to respect local customs."

"Not when they're personally humiliating!" She curled up on a padded



seat in the visitor's room and began to pout. He decided to drop the subject.

Repairing the synchronizers promised to be a week-long job, according to the Tragorian inspector who accompanied the *Idiot* upon landing. "Our replacements are standardized, of course—within our own system. But parts for SSC ships aren't carried in stock. The synchronizers will have to be specially tailored."

"Any chance of rushing the job?"

"A week is rushing it."

"All right, we'll have to wait." Roki nudged the controls a bit, guiding the ship toward the landing site pointed out by the captain. Daleth was in her cabin, alone, to save herself embarrassment.

"May I ask a question about your mission, E Roki—or is it confidential in nature?"

Roki paused to think before answering. He would have to lie, of course, but he had to make it safe. Suddenly he chuckled. "I forgot for a moment that you weren't with Sixty-Star Cluster. So I'll tell you the truth. This is supposed to be an observation mission, officially—but actually, our superior sent us to buy him a holdful of a certain scarce commodity."

The captain grinned. Graft and corruption were apparently not entirely foreign to Tragor III. But then his grin faded into thoughtfulness. "On Sol's planets?"

Roki nodded.

"This scarce commodity—if I'm not too curious—is it surgibank supplies?"

Roki felt his face twitch with surprise. But he recovered from his shock in an instant. "Perhaps," he said calmly. He wanted to grab the man by the shoulders and shout a thousand questions, but he said nothing else.

The official squirmed in his seat for a time. "Does your federation buy many mercy cargoes from Sol?"

Roki glanced at him curiously. The captain was brimming with ill-concealed curiosity. Why?

"Occasionally, yes."

The captain chewed his lip for a moment. "Tell me," he blurted, "will the Solarian ships stop for your patrol inspections?"

Roki hesitated for a long time. Then he said, "I suppose that you and I could get together and share what we know about Sol without revealing any secrets of our own governments. Frankly, I, too, am curious about Sol."

The official, whose name was We-Jan, was eager to accept. He scrawled a peculiar series of lines on a scrap of paper and gave it to Roki. "Show this to a heliocab driver. He will take you to my apartment. Would dinner be convenient?"

Roki said that it would.

The girl remained in her quarters when they landed. Roki knocked at

the door, but she was either stubborn or asleep. He left the ship and stood for a moment on the ramp, staring at the hazy violet sky. Fine grit sifted against his face and stung his eyes.

"You will be provided goggles, suitable clothing, and an interpreter to accompany you during your stay," said WeJan as they started toward a low building.

But Roki was scarcely listening as he stared across the ramp. A thousand yards away was a yellow-starred mercy ship, bearing Solar markings. The most peculiar thing about it was the ring of guards that surrounded it. They apparently belonged to the ship, for their uniforms were different from those of the base personnel.

WeJan saw him looking. "Strange creatures, aren't they?" he whispered confidentially.

Roki had decided that, in the long run he could gain more information by pretending to know more than he did. So he nodded wisely and said nothing. The mercy ship was too far away for him to decide whether the guards were human. He could make out only that they were bipeds. "Sometimes one meets strange ones all right. Do you know the Quinjori—from the other side of the galaxy?"

"No—no, I believe not, E Roki. Quinjori?"

"Yes. A very curious folk. Very curious indeed." He smiled to himself and fell silent. Perhaps, before his visit was over, he could trade fictions

about the fictitious Quinjori for facts about the Solarians.

Roki met his interpreter in the spaceport offices, donned the loose garb of Tragor, and went to quibble with repair service. Still he could not shorten the promised-time on the new synchros. They were obviously stuck for a week on Tragor. He thought of trying to approach the Solarian ship, but decided that it would be better to avoid suspicion.

Accompanied by the bandy-legged interpreter, whose mannerisms were those of a dog who had received too many beatings, Roki set out for Polarin, the Tragorian capitol, a few miles away. His companion was a small middle-aged man with a piping voice and flaring ears; Roki decided that his real job was to watch his alien charge for suspicious activities, for the little man was no expert linguist. He spoke two or three of the tongues used in the Sixty-Star Cluster, but not fluently. The Cophian decided to rely on the Esperanto of space, and let the interpreter translate it into native Tragorian whenever necessary.

"How would E Roki care to amuse himself?" the little man asked. "A drink? A pretty girl? A museum?"

Roki chuckled. "What do most of your visitors do while they're here?" He wondered quietly what, in particular, the *Solarian* visitors did. But it might not be safe to ask.

"Uh—that would depend on na-

tionality, sir," murmured Pok. "The true-human foreigners often like to visit the Wanderer, an establishment which caters to their business. The evolved-human and the nonhuman visitors like to frequent The Court of Kings—a rather, uh, peculiar place." He looked at Roki doubtfully, as if wondering about his biological status.

"Which is most expensive?" he asked, although he really didn't care. Because of the phony "observation mission papers," he could make Colonel Beth foot the bill.

"The Court of Kings is rather high," Pok said. "But so is the Wanderer."

"Such impartiality deserves a return. We will visit them both, E Pok. If it suits you."

"I am your servant, E Roki."

How to identify a Solarian without asking?—Roki wondered as they sat sipping a sticky, yeasty drink in the lounge of the Wanderer. The dimly lighted room was filled with men of all races—pygmies, giants, black, red, and brown. All appeared human, or nearly so. There were a few women among the crewmen, and most of them removed their borrowed veils while in the tolerant sanctuary of the Wanderer. The Tragorian staff kept stealing furtive glances at these out-system females, and the Cophian wondered about their covetousness.

"Why do you keep watching the strange women, E Pok?" he asked the

interpreter a few minutes later.

The small man sighed. "Evidently you have not yet seen Tragorian women."

Roki had seen a few heavily draped figures on the street outside, clinging tightly to the arms of men, but there hadn't been much to look at. Still, Pok's hint was enough to give him an idea.

"You don't mean Tragor III is one of those places where evolution has pushed the sexes further apart?"

"I do," Pok said sadly. "The feminine I.Q. is seldom higher than sixty, the height is seldom taller than your jacket pocket, and the weight is usually greater than your own. As one traveler put it: 'short, dumpy, and dumb'. Hence, the Purdah."

"Because you don't like looking at them?"

"Not at all. Theirs is our standard of beauty. The purdah is because they are frequently too stupid to remember which man is their husband."

"Sorry I asked."

"Not at all," said Pok, whose tongue was being loosened by the yeasty brew. "It is our tragedy. We can bear it."

"Well, you've got it better than some planets. On Jevah, for instance, the men evolved into sluggish spidery little fellows, and the women are big husky brawlers."

"Ah yes. But Sol is the most peculiar of all, is it not?" said Pok.

"How do you mean?" Roki care-

fully controlled his voice and tried to look bored.

"Why, the Vamir, of course."

Because of the fact that Pok's eyes failed to move toward any particular part of the room, Roki concluded that there were no Solarians in the place. "Shall we visit the Court of Kings now, E Pok?" he suggested.

The small man was obviously not anxious to go. He murmured about ugly brutes, lingered over his drink, and gazed wistfully at a big dusky Sanbe woman. "Do you suppose she would notice me if I spoke to her?" the small interpreter asked.

"Probably. So would her five husbands. Let's go."

Pok sighed mournfully and came with him.

The Court of Kings catered to a peculiar clientele indeed; but not a one, so far as Roki could see, was completely inhuman. There seemed to be at least one common denominator to all intelligent life: it was bipedal and bimanual. Four legs was the most practical number for any animal on any planet, and it seemed that nature had nothing else to work with. When she decided to give intelligence to a species, she taught him to stand on his hind legs, freeing his forefeet to become tools of his intellect. And she usually taught him by making him use his hands to climb. As a Cophian biologist had said, "Life first tries to climb a tree to get to the stars. When

it fails, it comes down and invents the high-C drive."

Again, Roki looked around for something that might be a Solarian. He saw several familiar species, some horned, some tailed, scaled, or heavily furred. Some stumbled and drooped as if Tragorian gravity weighted them down. Others bounced about as if floating free in space. One small creature, the native of a planet with an eight-hour rotational period, curled up on the table and fell asleep. Roki guessed that ninety per cent of the customers were of human ancestry, for at one time during the history of the galaxy, Man had sprung forth like a sudden blossom to inherit most of space. Some said they came from Sol III, but there was no positive evidence.

As if echoing his thoughts, Pok suddenly grunted, "I will never believe we are descended from those surly creatures."

Roki looked up quickly, wondering if the small interpreter was telepathic. But Pok was sneering toward the doorway. The Cophian followed his tipsy gaze and saw a man enter. The man was distinguished only by his height and by the fact that he appeared more human, in the classical sense, than most of the other customers. He wore a uniform—maroon jacket and gray trousers—and it matched the ones Roki had seen from a distance at the spaceport.

So this was a Solarian. He stared hard, trying to take in much at once.

The man wore a short beard, but there seemed to be something peculiar about the jaw. It was—predatory, perhaps. The skull was massive, but plump and rounded like a baby's, and covered with sparse yellow fur. The eyes were quick and sharp, and seemed almost to leap about the room. He was at least seven feet tall, and there was a look of savagery about him that caused the Cophian to tense, as if sensing an adversary.

"What is it you don't like about them?" he asked, without taking his eyes from the Solarian.

"Their sharp ears for one thing," whispered Pok as the Solarian whirled to stare toward their table. "Their nasty tempers for another."

"Ah? Rage reactions show biologic weakness," said the Cophian in a mild tone, but as loud as the first time.

The Solarian, who had been waiting for a seat at the bar, turned and stalked straight toward them. Pok whimpered. Roki stared at him coolly. The Solarian loomed over them and glared from one to the other. He seemed to decide that Pok was properly cowed, and he turned his fierce eyes on the ex-patrolman.

"Would you like to discuss biology, manthing?" he growled like distant thunder. His speaking exposed his teeth—huge white chisels of heavy ivory. They were not regressed toward the fanged stage, but they suggested, together with the massive jaw, that

nature might be working toward an efficient bone-crusher.

Roki swirled his drink thoughtfully. "I don't know you, Bristleface," he murmured. "But if your biology bothers you, I'd be glad to discuss it with you."

He watched carefully for the reaction. The Solarian went gray-purple. His eyes danced with fire, and his slit mouth quivered as if to bare the strong teeth. Just as he seemed about to explode, the anger faded—or rather, settled in upon itself to brood. "This is beneath me," the eyes seemed to be saying. Then he laughed cordially.

"My apologies. I thought to share a table with you."

"Help yourself."

The Solarian paused. "Where are you from, manthing?"

Roki also paused. They might have heard that a Cophian commander blasted one of their ships. Still he didn't care to be caught in a lie. "Sixty-Star Cluster," he grunted.

"Which sun?" The Solarian's voice suggested that he was accustomed to being answered instantly.

Roki glowered at him. "Information for information, fellow. And I don't talk to people who stand over me." He pointedly turned to Pok. "As we were saying—"

"I am of Sol," growled the big one.

"Fair enough. I am of Coph."

The giant's brows lifted slightly. "Ah, yes." He inspected Roki curiously and sat down. The chair creaked

a warning. "Perhaps that explains it."

"Explains what?" Roki frowned ominously. He disliked overbearing men, and his hackles were rising. There was something about this fellow —

"I understand that Cophians are given to a certain ruthlessness."

Roki pretended to ponder the statement while he eyed the big man coldly. "True, perhaps. It would be dangerous for you to go to Coph, I think. You would probably be killed rather quickly."

The angry color reappeared, but the man smiled politely. "A nation of duelists, I believe, military in character, highly disciplined. Yes? They sometimes serve in the Sixty-Star Forces, eh?"

The words left no doubt in Roki's mind that the Solarian knew who had blasted their ship and why. But he doubted that the man had guessed his identity.

"I know less of your world, Solarian."

"Such ignorance is common. We are regarded as the galactic rurals, so to speak. We are too far from your dense star clusters." He paused. "You knew us once. We planted you here. And I feel sure you will know us again." He smiled to himself, finished his drink, and arose. "May we meet again, Cophian."

Roki nodded and watched the giant stride away. Pok was breathing asthmatically and picking nervously at his

nails. He let out a sigh of relief with the Solarian's departure.

Roki offered the frightened interpreter a stiff drink, and then another. After two more, Pok swayed dizzily, then fell asleep across the table. Roki left him there. If Pok were an informer, it would be better to keep him out of the meeting with the patrol officer, Captain WeJan.

He hailed a cab and gave the driver the scrap of paper. A few minutes later, he arrived before a small building in the suburbs. WeJan's name was on the door—written in the space-tongue—but the officer was not at home. Frowning, he tried the door; locked. Then, glancing back toward the street, he caught a glimpse of a man standing in the shadows. It was a Solarian.

Slowly, Roki walked across the street. "Got a match, Bristle-face?" he grunted.

In the light of triple-moons, he saw the giant figure swell with rage. The man looked quickly up and down the street. No one was watching. He emitted a low animal-growl, exposing the brutal teeth. His arms shot out to grasp the Cophian's shoulders, dragging him close. Roki gripped the Multin automatic in his pocket and struggled to slip free. The Solarian jerked him up toward the bared teeth.

His throat about to be crushed, Roki pulled the trigger. There was a dull *chug*. The Solarian looked sur-

prised. He released Roki and felt of his chest. There was no visible wound. Then, within his chest, the incendiary needle flared to incandescent heat. The Solarian sat down in the street. He breathed a frying sound. He crumpled. Roki left hastily before the needle burned its way out of the body.

He hadn't meant to kill the man, and it had been in self-defense, but he might have a hard time proving it. He hurried along back alleys toward the spaceport. If only they could leave Tragor immediately!

What had happened to WeJan? Bribed, beaten, or frightened away. Then the Solarians *did* know who he was and where he was going. There were half a dozen men around the spaceport who knew—and the information would be easy to buy. Pok had known that he was to meet with WeJan, and the Solarian had evidently been sent to watch the captain's quarters. It wasn't going to be easy now—getting to Sol III and landing.

What manner of creatures were these, he wondered. Men who supplied mercy cargoes to the galactic nations—as if charity were the theme and purpose of their culture—yet who seemed as arrogant as the warriors of some primitive culture whose central value was brutal power? What did they really want here? The Solarian had called him “manthing” as if he regarded the Cophian as a member of some lesser species.

The Solarians were definitely different. Roki could see it. Their heads were plump and soft like a baby's, hinting of some new evolutionary trend—a brain that could continue growing, perhaps. But the jaws, the teeth, the quick tempers, and the hypersensitive ears—what sort of animal developed such traits? There was only one answer: a nocturnal predator with the instincts of a lion. “You shall get to know us again,” the man had said.

It spelled politico-galactic ambitions. And it hinted at something else—something that made the Cophian shiver, and shy away from dark shadows as he hurried shipward.

Daleth Incorporated was either asleep or out. He checked at the ship, then went to the Administration Building to inquire about her. The clerk seemed embarrassed.

“Uh . . . E Roki, she departed from the port about five.”

“You've heard nothing of her since?”

“Well . . . there was a call from the police agency, I understand.” He looked apologetic. “I assure you I had nothing to do with the matter.”

“Police! What . . . what's wrong, man?”

“I hear she went unescorted and unveiled. The police are holding her.”

“How long will they keep her?”

“Until some gentleman signs for her custody.”

"You mean I have to sign for her?"

"Yes, sir."

Roki smiled thoughtfully. "Tell me, young man — are Tragorian jails particularly uncomfortable?"

"I wouldn't know, personally," the clerk said stiffly. "I understand they conform to the intergalactic 'Code of Humanity' however."

"Good enough," Roki grunted. "I'll leave her there till we're ready to go."

"Not a bad idea," murmured the clerk, who had evidently encountered the cigar-chewing lady from Daleth.

Roki was not amused by the reversal of positions, but it seemed as good a place as any to leave her for safekeeping. If the Solarians became interested in him, they might also notice his pilot.

He spent the following day watching the Sol ship, and waiting fatalistically for the police to come and question him about the Solarian's death. But the police failed to come. A check with the news agencies revealed that the man's body had not even been found. Roki was puzzled. He had left the giant lying in plain sight where he had fallen. At noon, the Solarian crew came bearing several lead cases slung from the centers of carrying poles. They wore metal gauntlets and handled the cases cautiously. Roki knew they contained radioactive materials. So that was what they purchased with their surgi-bank supplies — nuclear fuels.

Toward nightfall, they loaded two large crates aboard. He noted the shape of the crates, and decided that one of them contained the body of the man he had killed. Why didn't they want the police to know? Was it possible that they wanted him free to follow them?

The Sol-ship blasted-off during the night. He was surprised to find it gone, and himself still unmolested, by morning. Wandering around the spaceport, he saw WeJan, but the man had developed a sudden lapse of memory. He failed to recognize the Cophian visitor. With the Solarians gone, Roki grew bolder in his questioning.

"How often do the Solarians visit you?" he inquired of a desk clerk at Administration.

"Whenever a hospital places an order, sir. Not often. Every six months perhaps."

"That's all the traffic they have with Tragor?"

"Yes, sir. This is our only interstellar port."

"Do the supplies pass through your government channels?"

The clerk looked around nervously. "Uh, no sir. They refuse to deal through our government. They contact their customers directly. The government lets them because the supplies are badly needed."

Roki stabbed out bluntly. "What do you think of the Solarians?"

The clerk looked blank for a moment, then chuckled. "I don't know,

myself. But if you want a low opinion, ask at the spaceport cafe."

"Why? Do they cause trouble there?"

"No, sir. They bring their own lunches, so to speak. They eat and sleep aboard ship, and won't spend a thin galak around town."

Roki turned away and went back to the *Idiot*. Somewhere in his mind, an idea was refusing to let itself be believed. A mercy ship visited Tragor every six months. Roki had seen the scattered, ruined cargo of such a ship, and he had estimated it at about four thousand pints of blood, six thousand pounds of frozen bone, and seven thousand pounds of various replaceable organs and tissues. That tonnage in itself was not so startling, but if Sol III supplied an equal amount twice annually to even a third of the twenty-eight thousand civilized worlds in the galaxy, a numbing question arose: where did they get their raw material? Surgibank supplies were normally obtained by contributions from accident victims who lived long enough to voluntarily contribute their undamaged organs to a good cause.

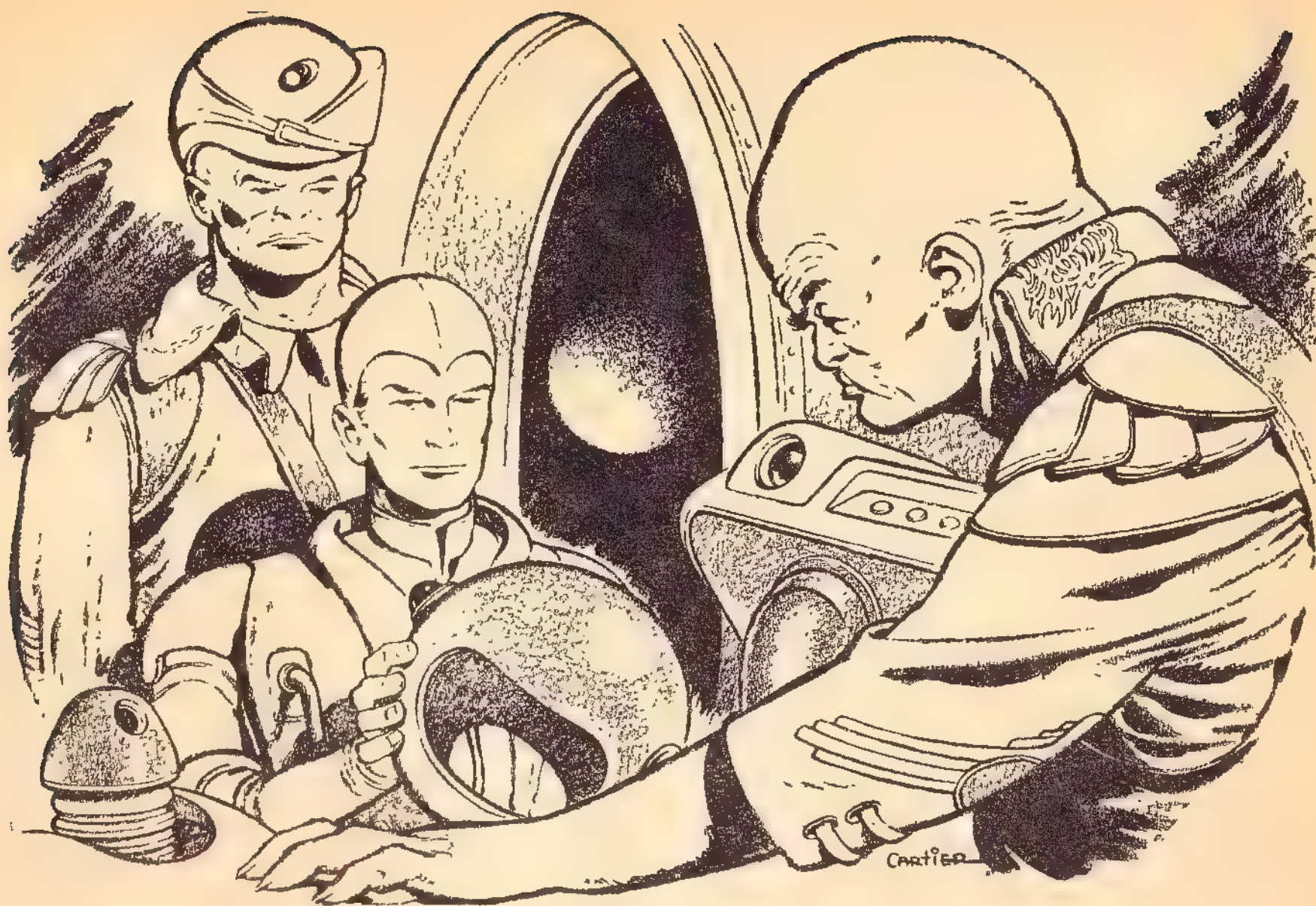
Charitable organizations tried to secure pledges from men in dangerous jobs, donating their bodies to the planet's surgibank in the event of death. But no man felt easy about signing over his kidneys or his liver to the bank, and such recruiters were less popular than hangmen or life insurance agents. Mercy supplies were

quite understandably scarce.

The grim question lingered in Roki's mind: where did the Sol III traders find between three and five million healthy accident victims annually? Perhaps they made the accidents themselves, accidents very similar to those occurring at the end of the chute in the slaughterhouse. He shook his head, refusing to believe it. No planet's population, however terrorized by its rulers, could endure such a thing without generating a sociological explosion that would make the world quiver in its orbit. There was a limit to the endurance of tyranny.

He spent the rest of the week asking innocent questions here and there about the city. He learned nearly nothing. The Solarians came bearing their peculiar cargo, sold it quickly at a good price, purchased fissionable materials, and blasted-off without a civil word to anyone. Most men seemed nervous in their presence, perhaps because of their bulk and their native arrogance.

When the base personnel finished installing the synchronizers, he decided the time had come to secure Daleth Incorporated from the local jail. Sometimes he had chided himself for leaving her there after the Solarians had blasted-off, but it seemed to be the best place to keep the willful wench out of trouble. Belatedly, as he rode toward the police station, he wondered what sort of mayhem she would attempt to commit on his per-



son for leaving her to fume in a cell. His smile was rueful as he marched in to pay her fine. The man behind the desk frowned sharply.

"Who did you say?" he grunted.

"The foreign woman from the Dalethian Ship."

The officer studied his records. "Ah, yes—Talewa Walkeka the name?"

Roki realized he didn't know her name. She was still Daleth Incorporated. "From the Daleth Ship," he insisted.

"Yes. Talewa Walkeka—she was released into the custody of Eli Roki on twoday of last spaceweek."

"That's imposs—" Roki choked

and whitened. "I am Eli Roki. Was the man a Solarian?"

"I don't recall."

"*Why don't you?* Didn't you ask him for identification?"

"Stop bellowing, please," said the official coldly. "And get your fists off my desk."

The Cophian closed his eyes and tried to control himself. "Who is responsible for this?"

The officer failed to answer.

"*You* are responsible!"

"I cannot look out for all the problems of all the foreigners who—"

"Stop! You have let her die."

"She is only a female."

Roki straightened. "Meet me at

any secluded place of your choice and I will kill you with any weapon of your choice."

The official eyed him coldly, then turned to call over his shoulder. "Sergeant, escort this barbarian to his ship and see that he remains aboard for the rest of his visit."

The Cophian went peacefully, realizing that violence would gain him nothing but the iron hospitality of a cell. Besides, he had only himself to blame, for leaving her there. It was obvious to him now—the contents of the second crate the Solarians had carried aboard consisted of Talewa Walkeka, lately of Daleth and high-C. Undoubtedly they had taken her alive. Undoubtedly she was additional bait to bring him on to Sol. Why did they want him to come? *I'll oblige them and find out for myself*, he thought.

The ship was ready. The bill would be sent back to Beth. He signed the papers, and blasted off as soon as possible. The lonely old freighter crept upward into the fifth component like a struggling old vulture, too ancient to leave its sunny lair. But the synchros were working perfectly, and the screen held its shape when the ascent ceased just below red-line level. He chose an evasive course toward Sol and began gathering velocity.

Then he fed a message into the coder, to be broadcast back toward the Sixty-Star Cluster: *Pilot abducted*

by Solarians; evidence secured to indicate that Solarian mercy-merchandise is obtained through genocide. He recorded the coded message on tape and let it feed continuously into the transmitters, knowing that the carrier made him a perfect target for homing devices, if anyone chose to silence him.

And he knew it was a rather poor bluff. The message might or might not be picked up. A listening ship would have to be at the same C-level to catch the signal. Few ships, save the old freighters, lingered long at ninety-thousand C's. But if the Solarians let him live long enough, the message would eventually be picked up—but not necessarily believed. The most he could hope for was to arouse curiosity about Sol. No one would care much about the girl's abduction, or about his own death. Interstellar federations never tried to protect their citizens beyond the limits of their own volume of space. It would be an impossible task.

Unless the Solarians were looking for him however, they themselves would probably not intercept the call. Their ships would be on higher C. And since they knew he was coming, they had no reason to search for him. At his present velocity and energy-level, he was four months from Sol. The mercy ship, on a higher level, would probably reach Sol within three weeks. He was a sparrow chasing a smug hawk.

But now there was more at stake than pride or reputation. He had set out to clear himself of a bad name, but now his name mattered little. If what he suspected were true, then Sol III was a potential threat to every world in the galaxy. Again he remembered the Solarian's form of address—"manthing"—as if a new race had arisen to inherit the places of their ancestors. If so, the new race had a right to bid for survival. And the old race called Man had a right to crush it if he could. Such was the dialectic of life.

Four months in the solitary confinement of a spaceship was enough to unnerve any man, however well-conditioned to it. He paced restlessly in his cell, from quarters to control to reactor room, reading everything that was aboard to read and devouring it several times. Sometimes he stopped to stare in Daleth's doorway. Her gear was still in the compartment, gathering dust. A pair of boots in the corner, a box of Dalethian cigars on the shelf.

"Maybe she has a book or two," he said once, and entered. He opened the closet and chuckled at the rough masculine clothing that hung there. But among the coarse fabrics was a wisp of pale green silk. He parted the dungarees to stare at the frail feminine frock, nestled toward the end and half-hidden like a suppressed desire. For a moment he saw her in it, strolling along the cool avenues of

a Cophian city. But quickly he let the dungarees fall back, slammed the door, and stalked outside, feeling ashamed. He never entered again.

The loneliness was overpowering. After three months, he shut off the transmitters and listened on the space-frequencies for the sound of a human voice. There was nothing except the occasional twittering of a coded message. Some of them came from the direction of Sol.

Why were they letting him come without interference? Why had they allowed him to transmit the message freely? Perhaps they wanted him as a man who knew a great deal about the military and economic resources of the Sixty-Star Cluster, information they would need if they had high ambitions in space. And perhaps the message no longer mattered, if they had already acquired enough nuclear materials for their plans.

After a logical analysis of the situation, he hit upon a better answer. Their ships didn't have the warp-locking devices that permitted one ship to slip into a parallel C with an enemy and stay with that enemy while it maneuvered in the fifth component. The Solarians had proven that deficiency when the "mercy ship" had tried to escape him by evasive coursing. If their own ships were equipped with the warp lockers, they would have known better than to try. They wanted such equipment.

Perhaps they thought that the *Idiot* possessed it, or that he could furnish them with enough information to let them build it.

After several days of correlating such facts as he already knew, Roki cut on his transmitters, fanned the beam down to a narrow pencil, and directed it toward Sol. "Blind Stab from Cluster-Ship *Idiot*," he called. "Any Sol Ship from *Idiot*. I have information to sell in exchange for the person of Talewa Walkeka. Acknowledge, please."

He repeated the message several times, and expected to wait a few days for an answer. But the reply came within three hours, indicating that a ship had been hovering just ahead of him, beyond the range of his own outmoded detectors.

"Cluster-Ship from Sol Seven," crackled the loud-speaker. "Do you wish to land on our planet? If so, please prepare to be boarded. One of our pilots will take you in. You are approaching our outer patrol zone. If you refuse to be boarded, you will have to turn back. Nonco-operative vessels are destroyed upon attempting to land. Over."

There was a note of amusement in the voice. They knew he wouldn't turn back. They had a hostage. They were inviting him to surrender but phrasing the invitation politely.

Roki hesitated. Why had the man said—"destroyed upon attempting to land?" After a moment's thought, he

realized that it was because they could not destroy a ship while maneuvering in the fifth component. They could not even stay in the same continuum with it, unless they had the warp-locking devices. A vague plan began forming in his mind.

"I agree conditionally. Do you have Talewa Walkeka aboard? If so, prove it by asking her to answer the following request in her own voice: 'List the garments contained in the closet of her quarters aboard this ship.' If this is accomplished satisfactorily, then I'll tentatively assume intentions are not hostile. Let me remind you, however, that while we are grappled together, I can rip half your hull off by hitting my C-drive—unless you're equipped with warp-locking devices."

That should do it, he thought. With such a warning, they would make certain that they had him aboard their own ship as a captive before they made any other move. And he would do his best to make it easy for them. Two or three hours would pass before he could expect an answer, so he began work immediately, preparing to use every means at his disposal to make a booby trap of the *Idiot*, and to set the trap so that only his continued well-being would keep it from springing.

The *Idiot's* stock of spare parts was strictly limited, as he had discovered previously. There were a few spare selsyns, replacement units for the

calculator and courser, radio and radar parts, control-mechanisms for the reactors, and an assortment of spare instruments and detectors. He augmented this stock by ruthlessly tearing into the calculator and taking what he needed.

He was hard at work when the answer came from the Sol ship. It was Daleth's voice, crisp and angry, saying, "Six pair of dungarees, a jacket, a robe, and a silk frock. Drop dead, Roki."

The Solarian operator took over. "Expect a meeting in six hours. In view of your threat, we must ask that you stand in the outer lock with the hatch open, so that we may see you as we grapple together. Please acknowledge willingness to co-operate."

Roki grinned. They wanted to make certain that he was nowhere near the controls. He gave them a grumbling acknowledgment and returned to his work, tearing into the electronic control-circuits, the radio equipment, the reaction-rate limiters, and the controls of the C-drive. He wove a network of interdependency throughout the ship, running linking-circuits from the air-lock mechanisms to the reactors, and from the communication equipment to the C-drive. Gradually the ship became useless as a means of transportation. The jets were silent. He set time clocks to activate some of the apparatus, and keyed other equipment by relays set

to trip upon the occurrence of various events.

It was not a difficult task, nor a long one. He added nothing really new. For example, it was easy to remove the wires from the air lock indicator lamp and feed their signal into a relay section removed from the calculator, a section which would send a control pulse to the reactors if the air locks were opened twice. The control pulse, if it came, would push the units past the red line. The relay sections were like single-task robots, set to obey the command: "If *this* happens, then push *that* switch."

When he was finished, the six hours were nearly gone. Pacing restlessly, he waited for them to come. Then, noticing a sudden flutter on the instruments, he glanced out to see the dark hulk slipping through his radiation screen. It came to a stop a short distance away.

Roki started the timers he had set, then donned a pressure suit. Carrying a circuit diagram of the changes he had wrought, he went to stand in the outer lock. He held open the outer hatch. The beam of a searchlight stabbed out to hold him while the Sol Ship eased closer. He could see another suited figure in its lock, calling guidance to the pilot. Roki glanced up at his own grapples; they were already energized and waiting for something to which they could cling.

The ships came together with a rocking jerk as both sets of grapples

caught and clung. Roki swung himself across a gravityless space, then stood facing the burly figure of the Solarian. The man pushed him into the next lock and stepped after him.

"Search him for weapons," growled a harsh voice as Roki removed his helmet. "And get the boarding party through the locks."

"If you do that, you'll blow both ships to hell," the Cophian commented quietly. "The hatches are rigged to throw the reactors past red line."

The commander, a sharp-eyed older man with a massive bald skull, gave him a cold stare that slowly became a sneer. "Very well, we can cut through the hull."

Roki nodded. "You can, but don't let any pressure escape. The throttles are also keyed to the pressure gauge."

The commander reddened slightly. "Is there anything else?"

"Several things." Roki handed him the circuit diagram. "Have your engineer study this. Until he gets the idea, anything you do may be dangerous, like trying to pull away from my grapples. I assure you we're either permanently grappled together, or permanently dead."

The Solarian was apparently his own engineer. He stared at the schematic while another relieved Roki of his weapon. There were four of them in the cabin. Three were armed and watching him carefully. He knew by their expressions that they considered him to be of a lesser species. And he

watched them communicate silently among themselves by a soundless language of facial twitches and peculiar nods. Once the commander looked up to ask a question.

"When will this timer activate this network?"

Roki glanced at his watch. "In about ten minutes. If the transmitter's periodic signals aren't answered in the correct code, the signals serve to activate the C-drive."

"I see that," he snapped. He glanced at a burly assistant. "Take him out. Skin him—from the feet up. He'll give you the code."

"I'll give it to you now," Roki offered calmly.

The commander showed faint surprise. "Do so then."

"The Cophian multiplication tables is the code. My transmitter will send a pair of Cophian numbers every two minutes. If you fail to supply the product within one second, a relay starts the C-drive. Since you can't guarantee an exactly simultaneous thrust, there should be quite a crash."

"Very well, give us your Cophian number symbols."

"Gladly. But they won't help you."

"Why not?"

"Our numbers are to the base eighteen instead of base ten. You couldn't react quickly enough unless you've been using them since childhood."

The Solarian's lips pulled back from his heavy teeth and his jaw muscles

began twitching. Roki looked at his watch.

"You have seven minutes to get your transmitter set up, with me at the key. We'll talk while I keep us intact."

The commander hesitated, then nodded to one of the guards who promptly left the room.

"Very well, manthing, we will set it up temporarily." He paused to smile arrogantly. "You have much to learn about our race. But you have little time in which to learn it."

"What do you mean?"

"Just this. This transmitter—and the whole apparatus—will be shut down after a certain period of time."

Roki stiffened. "Just how do you propose to do it?"

"Fool! By waiting until the signals stop. You obviously must have set a time limit on it. I would guess a few hours at the most."

It was true, but he had hoped to avoid mentioning it. The power to the control circuits would be interrupted after four hours, and the booby trap would be deactivated. For if he hadn't achieved his goal by then, he meant to neglect a signal during the last half-hour and let the C-ward lurch tear them apart. He nodded slowly.

"You're quite right. You have four hours in which to surrender your ship into my control. Maybe. I'll send the signals until I decide you don't mean to co-operate. Then—" He shrugged.

The Solarian gave a command to his aides. They departed in different directions. Roki guessed that they had been sent to check for some way to enter the *Idiot* that would not energize a booby circuit.

His host waved him through a doorway, and he found himself in their control room. A glance told him that their science still fell short of the most modern cultures. They had the earmarks of a new race, and yet Sol's civilization was supposedly the oldest in the galaxy.

"There are the transmitters," the commander barked. "Say what you have to say, and we shall see who is best at waiting."

Roki sat down, fingered the key, and watched his adversary closely. The commander fell into a seat opposite him and gazed coolly through narrowed lids. He wore a fixed smile of amusement. "Your name is Eli Roki, I believe. I am Space Commander Hulgruv."

A blare of sound suddenly came from the receiver. Hulgruv frowned and lowered the volume. The sound came forth as a steady musical tone. He questioned the Cophian with his eyes.

"When the tone ceases, the signals will begin."

"I see."

"I warn you, I may get bored rather quickly. I'll keep the signals going only until I think you've had time to assure yourselves that this is not a

bluff I am trying to put over on you.”

“I’m sure it’s not. It’s merely an inconvenience.”

“You know little of my home planet then.”

“I know a little.”

“Then you’ve heard of the ‘Sword of Apology.’”

“How does that—” Hulgruv paused and lost his smirk for an instant. “I see. If you blunder, your code demands that you die anyway. So you think you wouldn’t hesitate to neglect a signal.”

“Try me.”

“It may not be necessary. Tell me, why did you space them two minutes apart? Why not one signal every hour?”

“You can answer that.”

“Ah yes. You think the short period insures you against any painful method of persuasion, eh?”

“Uh-huh. And it gives me a chance to decide frequently whether it’s worth it.”

“What is it you want, Cophian? Suppose we give you the girl and release you.”

“She is a mere incidental,” he growled, fearful of choking on the words. “The price is surrender.”

Hulgruv laughed heartily. It was obvious he had other plans. “Why do you deem us your enemy?”

“You heard the accusation I beamed back to my Cluster.”

“Certainly. We ignored it, directly. Indirectly we made a fool of you by

launching another, uh, mercy ship to your system. The cargo was labeled as to source, and the ship made a point of meeting one of your patrol vessels. It stopped for inspection. You’re less popular at home than ever.” He grinned. “I suggest you return to Sol with us. Help us develop the warp locks.”

Roki hesitated. “You say the ship *stopped for inspection?*”

“Certainly.”

“Wasn’t it inconvenient? Changing your diet, leaving your ‘livestock’ at home—so our people wouldn’t know you for what you really are.”

Hulgruv stiffened slightly, then nodded. “Good guess.”

“*Cannibal!*”

“Not at all. I am not a man.”

They stared fixedly at one another. The Cophian felt the clammy cloak of hate creeping about him. The tone from the speaker suddenly stopped. A moment of dead silence. Roki leaned back in his chair.

“I’m not going to answer the first signal.”

The commander glanced through the doorway and jerked his head. A moment later, Talewa Walkeka stepped proudly into the room, escorted by a burly guard. She gave him an icy glance and said nothing.

“Daleth—”

She made a noise like an angry cat and sat where the guard pushed her. They waited. The first signal suddenly

screeched from the receiver: two series of short bleats of three different notes.

Involuntarily his hand leaped to the key. He bleated back the answering signal.

Daleth wore a puzzled frown. "Ilgen times ufneg is hork-segan," she muttered in translation.

A slow grin spread across Hulgruv's heavy face. He turned to look at the girl. "You're trained in the Cophian number system?"

"Don't answer that!" Roki bel-
lowed.

"She *has* answered it, manthing. Are you aware of what your friend is doing, female?"

She shook her head. Hulgruv told her briefly. She frowned at Roki, shook her head, and stared impassively at the floor. Apparently she was either drugged or had learned nothing about the Solarians to convince her that they were enemies of the galaxy.

"Tell me, Daleth. Have they been feeding you well?"

She hissed at him again. "Are you crazy—?"

Hulgruv chuckled. "He is trying to tell you that we are cannibals. Do you believe it?"

Fright appeared in her face for an instant, then disbelief. She stared at the commander, saw no guilt in his expression. She looked scorn at Roki.

"Listen, Daleth! That's why they wouldn't stop. Human livestock aboard. One look in their holds and we

would have known, seen through their guise of mercy, recognized them as self-styled supermen, guessed their plans for galactic conquest. They breed their human cattle on their home planet and make a business of selling the parts. Their first weapon is infiltration into our confidence. They knew that if we gained an insight into their bloodthirsty culture, we would crush them."

"You're insane, Roki!" she snapped.

"No! Why else would they refuse to stop? Technical secrets? Baloney! Their technology is still inferior to ours. They carried a cargo of hate. Our hate, riding with them unrecognized. They couldn't afford to reveal it."

Hulgruv laughed uproariously. The girl shook her head slowly at Roki, as if pitying him.

"It's true, I tell you! I guessed, sure. But it was pretty obvious they were taking their surgibank supplies by murder. And they contend they're not men. They guard their ships so closely, live around them while in port. And he admitted it to me."

The second signal came. Roki answered it, then began ignoring the girl. She didn't believe him. Hulgruv appeared amused. He hummed the signals over to himself—*without mistake*.

"You're using polytonal code for challenge, monotonal for reply. That makes it harder to learn."

The Cophian caught his breath. He



glanced at the Solarian's huge, bald braincase. "You hope to learn some three or four hundred sounds—and sound-combinations within the time I allow you?"

"We'll see."

Some note of contempt in Hulgruv's voice gave Roki warning.

"I shorten my ultimatum to one hour! Decide by then. Surrender, or I stop answering. Learn it, if you can."

"He can, Roki," muttered Daleth. "They can memorize a whole page at a glance."

Roki keyed another answer. "I'll cut it off if he tries it."

The commander was enduring the tension of the stalemate superbly. "Ask yourself, Cophian," he grunted

with a smile, "what would you gain by destroying the ship—and yourself? We are not important. If we're destroyed, our planet loses another gnat in space, nothing more. Do you imagine we are incapable of self-sacrifice?"

Roki found no answer. He set his jaw in silence and answered the signals as they came. He hoped the bluff would win, but now he saw that Hulgruv would let him destroy the ship. And—if the situation were reversed, Roki knew that he would do the same. He had mistakenly refused to concede honor to an enemy. The commander seemed to sense his quiet dismay, and he leaned forward to speak softly.

"We are a new race, Roki—grown out of man. We have abilities of which you know nothing. It's useless to fight us. Ultimately, your people will pass away. Or become stagnant. Already it has happened to man on Earth."

"Then—there *are two* races on Earth."

"Yes, of course. Did apes pass away when man appeared? The new does not replace the old. It adds to it, builds above it. The old species is the root of the new tree."

"Feeding it," the Cophian grunted bitterly.

He noticed that Talewa was becoming disturbed. Her eyes fluttered from one to the other of them.

"That was inevitable, manthing. There are no other animal foodstuffs on Earth. Man exhausted his planet, overpopulated it, drove lesser species into extinction. He spent the world's resources getting your ancestors to the denser star-clusters. He saw his own approaching stagnation on Earth. And, since Sol is near the rim of the galaxy, with no close star-neighbors, he realized he could never achieve a mass-exodus into space. He didn't have the C-drive in its present form. The best he could do was a field-cancellation drive."

"But that's the heart of the C-drive."

"True. But he was too stupid to realize what he had. He penetrated the fifth component and failed to realize what he had done. His ships

went up to five-hundred C's or so, spent a few hours there by the ship's clock, and came down to find several years had passed on Earth. They never got around that time-lag."

"But that's hardly more than a problem in five-space navigation!"

"True again. But they still thought of it in terms of field-cancellation. They didn't realize they'd actually left the four-space continuum. They failed to see the blue-shift as anything more than a field-phenomenon. Even in high-C, you measure light's velocity as the same constant—because your measuring instruments have changed proportionally. It's different, relative to the home continuum, but you can't know it except by pure reasoning. They never found out.

"Using what they had, they saw that they could send a few of their numbers to the denser star-clusters, if they wanted to wait twenty thousand years for them to arrive. Of course, only a few years would pass aboard ship. They knew they could do it, but they procrastinated. Society was egalitarian at the time. Who would go? And why should the planet's industry exhaust itself to launch a handful of ships that no one would ever see again? Who wanted to make a twenty thousand year investment that would impoverish the world? Sol's atomic resources were never plentiful."

"How did it come about then?"

"Through a small group of men who

didn't *care* about the cost. They seized power during a 'population rebellion' — when the sterilizers were fighting the euthanasiasts and the do-nothings. The small clique came into power by the fantastic promise of draining off the population-surplus into space. Enough of the stupid believed it to furnish them with a strong backing. They clamped censorship on the news agencies and imprisoned everyone who said it couldn't be done. They put the planet to work building ships. Their fanatic personal philosophy was: 'We are giving the galaxy to Man. What does it matter if he perishes on Earth?' They put about twelve hundred ships into space before their slave-structure collapsed. Man never developed another technology on Sol III. He was sick of it."

"And *your* people?"

Hulgruv smiled. "A natural outgrowth of the situation. If a planet were glutted with rabbits who ate all the grass, a species of rabbits who learned to exploit other rabbits would have the best chance for survival. We are predators, Cophian. Nature raised us up to be a check on your race."

"You pompous fool!" Roki snapped. "Predators are specialists. What abilities do you have — besides the ability to prey on man?"

"I'll show you in a few minutes," the commander muttered darkly.

Daleth had lost color slowly as she listened to the Solarian's roundabout admission of Roki's charge. She sud-

denly moaned and slumped in a sick heap. Hulgruv spoke to the guard in the soundless facial language. The guard carried her away quickly.

"If you were an advanced species, Hulgruv — you would not have let yourself be tricked so easily, by me. And a highly intelligent race would discover the warp locks for themselves."

Hulgruv flushed. "We underestimated you, manthing. It was a natural mistake. Your race has sunk to the level of cattle on Earth. As for the warp locks, we know their principles. We have experimental models. But we could short-circuit needless research by using your design. We are a new race, new to space. Naturally we cannot do in a few years what you needed centuries to accomplish."

"You'll have to look for help elsewhere. In ten minutes, I'm quitting the key — unless you change your mind."

Hulgruv shrugged. While Roki answered the signals, he listened for sounds of activity throughout the ship. He heard nothing except the occasional clump of boots, the brief mutter of a voice in the corridor, the intermittent rattling of small tools. There seemed to be no excitement or anxiety. The Solarians conducted themselves with quiet self-assurance.

"Is your crew aware of what is happening?"

"Certainly."

As the deadline approached, his fingers grew nervous on the key. He steeled himself, and waited, clutching at each second as it marched past. What good would it do to sacrifice Daleth and himself? He would succeed only in destroying one ship and one crew. But it was a good trade — two pawns for several knights and a rook. And, when the Solarians began their march across space, there would be many such sacrifices.

For the last time, he answered a signal, then leaned back to stare at Hulgruv. "Two minutes, Solarian. There's still time to change your mind."

Hulgruv only smiled. Roki shrugged and stood up. A pistol flashed into the commander's hand, warning him back. Roki laughed contemptuously.

"Afraid I'll try to take your last two minutes away?"

He strolled away from the table toward the door.

"Stop!" Hulgruv barked.

"Why? I want to see the girl."

"Very touching. But she's busy at the moment."

"What?" He turned slowly, and glanced at his watch. "You don't seem to realize that in fifty seconds —"

"We'll see. Stay where you are."

The Cophian felt a sudden coldness in his face. Could they have found a flaw in his net of death? — a way to circumvent the sudden application of the *Idiot's* C-drive, with its consequent ruinous stresses to both ships? Or

had they truly memorized the Cophian symbols to a one second reaction time?

He shrugged agreeably and moved in the general direction of the transmitter tuning units. There was one way to test the possibility. He stopped several feet away and turned to face Hulgruv's suspicious eyes. "You are braver than I thought," he growled.

The admission had the desired effect. Hulgruv tossed his head and laughed arrogantly. There was an instant of relaxation. The heavy automatic wavered slightly. Roki backed against the transmitters and cut the power switch. The hum died.

"Ten seconds, Hulgruv! Toss me your weapon. Shoot and you shatter the set. Wait and the tubes get cold. *Toss it!*"

Hulgruv bellowed, and raised the weapon to fire. Roki grinned. The gun quivered. Then with a choking sound, the Solarian threw it to him. "Get it on!" he howled. "*Get it on!*"

As Roki tripped the switch again, the signals were already chirping in the loud-speaker. He darted aside, out of view from the corridor. Footsteps were already racing toward the control room.

The signals stopped. Then the bleat of an answer! Another key had been set up in the adjoining room! With Daleth answering the challenges?

The pistol exploded in his hand as the first crewman came racing through the doorway. The others backed out

of sight into the corridor as the projectile-weapon knocked their comrade back in a bleeding sprawl. Hulgruv made a dash for the door. Roki cut him down with a shot at the knee.

"The next one takes the transmitter," he bellowed. "Stay back."

Hulgruv roared a command. "Take him! If you can't, let the trap spring!"

Roki stooped over him and brought the pistol butt crashing against his skull, meaning only to silence him. It was a mistake; he had forgotten about the structure of the Solarian skull. He put his foot on Hulgruv's neck and jerked. The butt came free with a wet *cluck*. He raced to the doorway and pressed himself against the wall to listen. The crewmen were apparently having a parley at the far end of the corridor. He waited for the next signal.

When it came, he dropped to the floor—to furnish an unexpected sort of target—and snaked into view. He shot twice at three figures a dozen yards away. The answering fire did something to the side of his face, blurring his vision. Another shot sprayed him with flakes from the deck. One crewman was down. The others backed through a door at the end of the corridor. They slammed it and a pressure seal tightened with a rubbery sound.

Roki climbed to his feet and slipped toward a doorway from which he heard the click of the auxiliary key. He felt certain someone was there be-

sides Daleth. But when he risked a quick glance around the corner, he saw only the girl. She sat at a small desk, her hand frozen to the key, her eyes staring dazedly at nothing. He started to speak, then realized what was wrong. Hypnosis! Or a hypnotic drug. She sensed nothing but the key beneath her fingers, waiting for the next challenge.

The door was only half-open. He could see no one, but there had been another man; of that he was certain. Thoughtfully he took aim at the plastic door panel and fired. A gun skidded toward Daleth's desk. A heavy body sprawled across the floor.

The girl started. The dull daze left her face, to be replaced with wide-eyed shock. She clasped her hands to her cheeks and whimpered. A challenge bleated from the radio.

"Answer!" he bellowed.

Her hand shot to the key and just in time. But she seemed about to faint.

"Stay on it!" he barked, and dashed back to the control room. The crewmen had locked themselves aft of the bulkhead, and had started the ventilator fans. Roki heard their whine, then caught the faint odor of gas. His eyes were burning and he sneezed spasmodically.

"Surrender immediately, man-thing!" blared the intercom.

Roki looked around, then darted toward the controls. He threw a damping voltage on the drive tubes,

defocused the ion streams, and threw the reactors to full emission. The random shower of high-speed particles would spray toward the focusing coils, scatter like deflected buckshot, and loose a blast of hard X-radiation as they peppered the walls of the reaction chambers. Within a few seconds, if the walls failed to melt, the crewmen back of the bulkhead should recognize the possibility of being quickly fried by the radiant inferno.

The tear gas was choking him. From the next compartment, he could hear Daleth coughing and moaning. How could she hear the signals for her own weeping? He tried to watch the corridor and the reaction-chamber temperature at the same time. The needle crept toward the danger-point. An explosion could result, if the walls failed to melt.

Suddenly the voice of the intercom again: "Shut it off, you fool! You'll destroy the ship."

He said nothing, but waited in tense silence, watching the other end of the corridor. Suddenly the ventilator fans died. Then the bulkhead door opened a crack, and paused.

"Throw out your weapon first!" he barked.

A gun fell through the crack and to the floor. A Solarian slipped through, sneezed, and rubbed his eyes.

"Turn around and back down the corridor."

The crewman obeyed slowly. Roki stood a few feet behind him, using him

for a shield while the others emerged. The fight was gone out of them. It was strange, he thought; they were willing to risk the danger of the *Idiot's* C-drive, but they couldn't stand being locked up with a runaway reactor. They could see death coming then. He throttled back the reactors, and prodded the men toward the storage rooms. There was only one door that suggested a lockup. He halted the prisoners in the hallway and tried the bolt.

"Not in there, manthing!" growled one of the Solarians.

"Why not?"

"There are—"

A muffled wail from within the compartment interrupted the explanation. It was the cry of a child. His hand trembled on the bolt.

"They are wild, and we are weaponless," pleaded the Solarian.

"How many are in there?"

"Four adults, three children."

Roki paused. "There's nowhere else to put you. One of you—you there—go inside, and we'll see what happens."

The man shook his head stubbornly in refusal. Roki repeated the order. Again the man refused. The predator, unarmed, was afraid of its prey. The Cophian aimed low and calmly shot him through the leg.

"Throw him inside," he ordered tonelessly.

With ill-concealed fright for their own safety, the other two lifted their

screaming comrade. Roki swung open the door and caught a brief glimpse of several human shadows in the gloom. Then the Solarian was thrown through the doorway and the bolt snapped closed.

At first there was silence, then a bull-roar from some angry throat. Stamping feet—then the Solarian's shriek—and a body was being dashed against the inside walls while several savage voices roared approval. The two remaining crewmen stood in stunned silence.

"Doesn't work so well, does it?" Roki murmured with ruthless unconcern.

After a brief search, he found a closet to lock them in, and went to relieve Daleth at the key. When the last signal came, at the end of the four hours, she was asleep from exhaustion. And curled up on the floor, she looked less like a tough little frontier urchin than a frightened bedraggled kitten. He grinned at her for a moment, then went back to inspect the damage to the briefly overloaded reactors. It was not as bad as it might have been. He worked for two hours, replacing fused focusing sections. The jets would carry them home.

The *Idiot* was left drifting in space to await the coming of a repair ship. And Daleth was not anxious to fly it back alone. Roki set the Solarian vessel on a course with a variable C-level, so that no Sol ship could track them

without warp lockers. As far as Roki was concerned the job was done. He had a shipful of evidence and two live Solarians who could be forced to confirm it.

"What will they do about it?" Daleth asked as the captured ship jetted them back toward the Sixty-Star Cluster.

"Crush the Solarian race immediately."

"I thought we were supposed to keep hands-off nonhuman races?"

"We are, unless they try to exploit human beings. That is automatically an act of war. But I imagine an ultimatum will bring a surrender. They can't fight without warp lockers."

"What will happen on Earth when they do surrender?"

Roki turned to grin. "Go ask the human Earthers. Climb in their cage."

She shuddered, and murmured, "Some day—they'll be a civilized race again, won't they?"

He sobered, and stared thoughtfully at the star-lanced cosmos. "Theirs is the past, Daleth. Theirs is the glory of having founded the race of man. They sent us into space. They gave the galaxy to man—in the beginning. We would do well to let them alone."

He watched her for a moment. She had lost cockiness, temporarily.

"Stop grinning at me like that!" she snapped.

Roki went to feed the Solarian captives: canned cabbage.

THE END

tration, he might have guessed it was a symbolic map of the computer that was the reason for the existence of Thar, but he could hardly have known. The fourth wall was also bewildering. Prosaically enough, there was a door in it. But the rest of the wall was hidden behind what might have been taken for the console of a huge organ, except that the keys were of many colors, and had weird symbols inscribed on them. Also, between the rows of keys, there was a multitude of dials and knobs.

Sita Lanter, secretary to the Chief Mathematician, opened the door enough to slide in. Closing it quietly, she leaned against it and looked at her boss behind the desk. In many ways, she was a very attractive girl. Her blond face and trim figure were not often ignored by the male sex. But there was in her eyes a glint of hardness, of cynicism and of intolerance for hypocrisy that made most men uncomfortable.

The man at whom she looked, Lan Korbet, was sitting with his chin in his hands. His eyes were on the blackboard but they were unseeing. His face was relaxed in perfect concentration. He was a young man. Surprisingly so for the responsibilities he held as Chief Mathematician. Not a very handsome man, but one with a keenness—an awareness, even in his abstraction—that compelled attention. He had an air of utter competence.

When she had waited a moment

without response, Sita told him: "Our estimable Chairman of the Board is outside."

His eyes swung slowly to her. "Oh? What does he want?"

"He did not say," she said. "Something, no doubt. Curlin doesn't do anything without a motive. But I can hardly insist that he tell me, can I?"

Lan smiled. "I didn't know there were limits to what you can do. Send him in."

"Turn on the intercom," she told him. "I'll put a recorder on it."

"It would do no good," he shrugged. "The people trust him, not me. Anyway, I don't play that way. And neither does anyone who works for me."

"Well, turn it on anyway," she said. "I promise no recorder. But I got to keep track of my own job. And if he gets you, I'll be looking for a new one myself."

"Doesn't anything mean more to you than that? Some day, when I am not so busy, I shall have to find out if you have a heart under that egoism." He did not look angry, however. And he did turn on the intercom.

Sita stared at him but said nothing. She smiled enigmatically, and then turned to open the door. She had, after all, got what she wanted. She would be able to hear what passed between her boss and Curlin. The question of why she wanted to hear it, whether for her own sake or for his, was another question. And if Lan did not know the answer to it, at least she did.

The man who came in at her invitation was a big man. He was handsome, with the air of honest geniality that has always been so useful to politicians. He was a man to inspire confidence in the average individual. And since the average voter had little chance to see the fraud that lay behind that open glance, he was a very successful politician.

Sita returned to her desk and sat down. She put a headphone on and adjusted a control until she could hear the men inside.

They were still talking trivialities, she found. It was not for some minutes that she found reason to sit up and listen closely. Not until she heard Curlin say, in an offhand tone: "I suppose you are working hard on your report?"

"Oh, it's pretty well done," she heard Lan answer. "After all, the Board meeting is the day after tomorrow, and the final typing takes the better part of a day."

"Of course," Curlin audibly nodded. "This meeting, incidentally, will be rather an important one. That is what I wanted to discuss with you."

"Oh?" Lan's voice was courteous but cold.

"Yes." The politician's voice was equally cold and courteous. "I think the time has come when you must make a final decision."

"Regarding what?"

"I am going to be very frank, Lan," Curlin said. "This could be rather

embarrassing to me if what I am going to say should get out. However, I shall accept your promise that it will not."

"I promise nothing." Lan's voice was curt.

Curlin sighed audibly. "I feared as much. You have always been uncooperative. However, I am still willing to talk frankly. I don't think anyone would believe you. The average man is stupid. He trusts men like me, and not people like you. He thinks I'm the friend of the people, concerned only with their welfare. He calls you a 'long-hair' and holds you in awe—but also in contempt. He is a fool. And because he is a fool, I find I am strong enough to have you thrown out of this office. I intend to do it at the next Board meeting—the day after tomorrow."

"You are going to demand my resignation?"

"I, or one of my tools."

There was a pause, and then Lan asked: "On what grounds?"

"On the grounds of incompetence." Curlin's voice was smooth. "I shall hold you responsible for the progressive breakdown of the Computer. This dates, I know, from far before your time. But the people are only just beginning to realize just how serious it is. It has only recently gone far enough to scare them. So you can be made the goat."

"And how do you do that?" Lan asked. "The cause of the creeping breakdown is the Subtronic Drive.

How do you make me responsible for that?"

"It is your responsibility to adapt the Computer to new conditions." Curlin's voice was patient. "The existence of the Subtronic Drive is a new condition. Or, at least, its widespread use is. And you have not been able to adapt the Computer to it. You have failed your responsibility. Your defense that the problem is logically insoluble is obviously only an evasion, a feeble attempt to absolve yourself from blame. Personally, when you say it is insoluble, I happen to believe you. I don't know that I fully understand your argument, but I have great trust in your technical abilities. Only, the people don't. They only have trust in me. And they will hold you responsible unless I tell them different."

"And you aren't going to tell them different." It was a statement that Lan made.

"No, I don't think so. At least, not unless I can make a deal with you. Which, as a matter of fact, is why I am here telling you these things."

"You expect me to make a deal with you?" Lan's voice sneered.

"As a matter of fact, no." Curlin's voice was cheerful. "I fear you are too much of a political fool, however much you may be a technical genius. Actually, it would make sense, even with your idealism. What I want is power. I don't think I can get complete control over the entire Federation. I

would like it, I admit, but I don't think I can get it. I am willing to settle for this world. All I ask of you is that you give me a little help."

"All you want," Lan sneered, "is that I direct the Computer's malfunctioning so that Thar gets preferential treatment. You will take the credit and be the fair-haired boy of Thar. Besides using the information to make yourself rich. Isn't that it?"

"Exactly." Curlin sounded completely unruffled. "That is, of course, strictly against all your principles. But the point is that I can force you out. Then I shall appoint someone else—somebody who will do what I want. Only he won't be as clever as you are. The chap I have in mind has nowhere near your ability. He has enough to do the job I want, but he will probably wreck the Federation while he does it. So, by giving me what I want, you can save the Plan."

He paused, and then continued. "As I said, I do not think I can take over the whole Federation. But, if it starts to break up, I may be able to capture a large part. You could prevent this. So maybe I am dumb to offer you a deal. Maybe I ought to actually work to knock down the whole Plan. I have thought it over and I am still making you the offer. The right man in the right place can profit greatly from chaos. I am the right man but whether I am in the right place or not is strictly a guess at this point. And I do not like having to be

lucky as well as skillful. I would rather play it safe for smaller stakes. This is why I am making you the offer."

"I do not quite get it," Lan said. "Suppose you do put your chap in. What will he do about the Subtronic Drive?"

"Nothing," Curlin admitted. "But, by the time the people see he isn't going to, it will be too late. And, if necessary, we will fire him and get us a new stooge. By the way, I am still curious as to just why this problem is insoluble."

"Why? Because it is so fundamental." Lan sounded impatient. "The Plan for which the Trade Coordination Administration was organized was based on the principle that trade between the fifteen hundred worlds of the Federation must be kept balanced. The heart—or, perhaps, brain—of the Administration is the Computer here on Thar. It collects the information as to who needs what or has which to spare. It figures out the best possible arrangement of trade so that everybody gets the best deal possible. Now the one bit of information that is absolutely basic to this job is the topology of the Federation. It has to know who *can* trade with whom, before it can study who *ought* to trade what with whom. And this is the information that it cannot get with the Drive.

"The Drive allows any world that feels unhappy to just take off. Because

of the vast distances over which it can move a world, and the short interval of 'real' time that it takes, the Uncertainty principle is terrifically magnified. So when a world turns on its Drive, it doesn't know where it is going. This does not greatly bother it. With the Mesonic Prime Generator supplying unlimited power, it can take care of itself no matter where it lands. There is no need to land near a star. So a world that is moving doesn't care that it only knows the very general area of space for which it is heading. But the Computer does. The Computer has to know who you are going to be able to trade with. It takes from six months to two years for the news to get back. In the meantime, the Computer does not know the topology for which it must find a solution."

Curlin chuckled. "A pretty problem, I admit. But why is the breakdown progressive? The Drive's been known for a hundred years or so. And the Generator for a good deal longer. Why is it only getting serious now?"

"Because," Lan answered, "before a world takes off, it has to have both the Drive and the Generator. And these are not simple gadgets. Their construction taxes the full resources of a highly industrialized world. The only worlds that were able to build them at first were the most prosperous of the Federation. And only those prosperous ones whose prosperity was based on industry. Now, generally, these worlds had no reason to move.

They had prospered under the existing topology. Why change it? But, as a few worlds did move, and the topology was changed, things happened. Worlds that had been favorably located found themselves on the short end—and, since they had the Drive and Generator, having been prosperous, they promptly moved, changing the topology again. And, with the shifting topology, worlds that had been badly off sometimes found themselves well off for a change. Most of these worlds had the good sense to immediately use their new prosperity to build the Drive and Generator needed to protect their new good fortune.

“Anyway, we have now reached the point where a great many members of the Federation have the Drive and Generator, and can, if they want, move. There are enough in this position so that, by the Law of Probability, some of these will be, or will think they are, unfavorably located under almost any topology. We are reaching the point where there are always dissatisfied members who are able to do something about it. And some of these are always doing it.

“At the moment, three worlds are ‘lost.’ The last time we knew where everybody was all at once was over twelve years ago. We have not gotten a complete integration of the trade problem since then. And the longer we go without a complete integration, the more fouled up the Computer becomes.

“But you must know all this. It is in practically every report I have written.” Lan’s voice was surprised.

“I rarely read reports.” Curlin’s voice was dry. “However, you are right. I do know it, although I am glad to get a review. But I let you talk to give you time to think about my proposition.”

“That I sell out Thar to you for the right to try to keep you from getting the rest of the Federation?”

“A somewhat brutal way of putting it.” Curlin’s voice was mild. “Let us say rather ‘for the right to try to save as much of the Plan as can be saved under the circumstances.’”

“I prefer my way of putting it.” There was a rasp in Lan’s tone. “The answer is ‘no’. It has to be ‘no’ for the very simple reason that the sell-out of Thar would itself destroy the Federation and the Plan. It would break the faith of the other worlds in us.”

“That is your final answer?” Curlin did not sound surprised.

“It is.” Lan’s voice was bleak and cold.

“You do not want to think it over? I can give you a little time.”

“It is not necessary. The answer is ‘no’ and will remain ‘no!’” There was finality in the mathematician’s voice. “And now, if you please, I have work to do.”

“You are a fool, boy. I admire you for it, in a way. But, nevertheless, you are a fool. Good day.”

Sita leaned back in her chair and took off the headphones through which she had been eavesdropping on the meeting. Her lips were thin and drawn. They moved, silently mouthing the words: "You are a fool, Lan; a blighted, benighted idiot of a fool. But I love you for it." Her eyes were hooded as she watched Curlin cross her office and walk out. As the door closed behind him, she got up and walked into her boss' office. As before, she leaned against the door and said nothing.

Lan was sitting, his head in his hands. He raised it to look at her. "You heard?" he asked.

"I heard," she said.

"If he were only less intelligent, less capable, it would not be so bad. But, unless somebody can stop him, he will most certainly wreck the Federation. How can a man do that, Sita?" It was a blind man, crying in the dark. "How can a man deliberately set out to wreck the work of centuries, just to satisfy his own lust for power? He knows the only thing that stopped the Chain of Wars was the Plan. And yet he's willing to wreck it! He doesn't care!"



"There are people like that." Sita's voice was soft and sympathetic. "And people like you are often helpless against people like him. I take it he really can shove you out and put his stooge in?"

"Oh, yes." Lan looked old at the moment. "He can. He has complete control of the Board. Cernok is his tool. Bahnfred is an idiot who believes what Curlin tells him. Riccon is honest and intelligent. But he has so little self-confidence that before he will have made up his mind, it will be all over. Crillon is a crook. Curlin's probably made a deal with him. Twik is too old, emotionally and mentally, as well as chronologically. He does not care any more. And there you are."

"And, having got his stooge in as Chief Mathematician, he can take over Thar?"

"Probably. The Computer is running so poorly—giving conflicting or impossible orders and whatnot—that it could easily be manipulated. But whether Curlin succeeds or not, his trying will at least wreck the Plan."

"And the poor operation of the Computer cannot be helped?"

"No. The malfunctioning stems from the shifting topology of the Federation. And there is nothing anybody can do about that."

"Oh." Sita looked thoughtful. "Then you have lost. The battle is finished. And with it the war. So, my motherly advice is to pick up the pieces. That's also my sisterly advice. And any other

kind you might be willing to accept." Her smile was cynical, but there was something behind it that was not at all cynical.

He looked at her with a startled expression. "Are you trying to proposition me?"

"Who me?" She tried to look insulted. "I'll have you know, sir—But since, I expect to be your secretary for only a couple more days, and since I have never got more than a dinner or two out of you, and since I also prescribe as your family advisor, a little alcohol for your troubles—" She tilted her head as she looked at him.

He smiled and then chuckled. "You tempt me. But . . . there is work to do. Give me a rain check, will you? I hope I'll be able to use it some day."

"Work?" She seemed genuinely surprised. "Why? Does your conscience demand that you go through all the motions all the way up to when the ax falls?"

"No." Lan meditated a moment. "But I still hold the title of Chief Mathematician. And that title still commands respect."

"So you think you had better act up to it, eh?" There was mockery in her tone.

"N-no," he answered, thoughtfully. "No, that is not it."

"It still sounds like an overworked conscience to me," she said. "I think you had better forget all that hogwash and take me out. It will be much more

fun, I promise you." Her smile confirmed the promise.

"Get thee behind me, Satan. But, in point of fact, you don't understand. The war is lost, yes. But the decision as to precisely how the surrender will take place is yet to be made."

"Even that sounded like it was settled," she said. "At the Board meeting."

"True," he admitted. "But the metaphor is not exact. The point is I am still the Chief Mathematician. And will be for another day and two nights. And there are still some things I can do to decide the future course of history."

"You can stop Curlin? Even now?" Sita gaped at him.

"No. Probably not. But—"

"But what?" She was getting exasperated.

"Oh, just 'but.' I do not choose to talk." He smiled to take the sting from his words. "I don't want to talk because, little Sita, I don't want you hounding me. I have to make up my own mind. Nothing you could say would help. So I'd rather you didn't say it. As the Chief Mathematician, I am alone. It has to be this way. Do you see?"

She studied him, frowning. She seemed troubled but she said: "Have it your own way. But if you want the rain check you mentioned, at least you'll have to come home to supper with me. And this, I might add, is not a proposition. My brother will be

there, too."

He blinked, "You know, it sounds like you're worried about me." He stared at her. "However, if it will make you feel better, I shall come." He suddenly smiled. "That is gracious of me, isn't it? But I would like it, really."

Sita looked happy as she went to get her coat. Happy but puzzled. There was something here she could not understand. Something that scared her. Lan agreed he could not stop Curlin. But still, there was something he could do—something he apparently did not want to do. There was a decision to be made, and she could not even begin to guess what the decision involved. But at least she could make him lay aside his problem for a little while.

Sita's house on the outskirts of the city of Thar was just big enough to hold comfortably her two guests. She could hear them in the living room as she was cleaning up after the dinner. Lan, she knew was stretched out in the big chair, probably studying the bubbles in his glass. Her brother, Tryg, was equally stretched out on the couch.

She thought with satisfaction of the dinner. It had been a success. Lan had, at its end, very cheerfully admitted that she could, indeed, cook. And the two men had been friends when she was still in school. Lan, she knew, had great respect for the other.

And Tryg, deep down where he would hardly admit it to himself, practically worshiped the mathematician. Tryg was an engineer. But, as a man, he was more than that. He had a mind that ranged, covering all sorts of unlikely subjects for an engineer, willing to challenge all dogmatism. He was, she thought, the antidote Lan needed.

She heard Tryg's drawl now—the drawl he used when advancing one of his more preposterous hypotheses. "You know," he was saying, "I sometimes wonder where all this is leading to. The treasonable thought occurs to me to ask if the Trade Co-ordination Administration is really a good thing. What would happen if we suddenly stopped?"

"Chaos," Lan answered. "Utter, complete chaos."

"Precisely," Tryg said. "But is that bad?"

"Don't tell me you are an anarchist?" There was laughter in Lan's voice. "And here I thought you were intelligent. Do you really want us to go back to hunting our food with bow and arrow? Or is it the thought of dragging your women off by their hair that appeals to you?"

She heard Tryg chuckle. "You are extrapolating my words far beyond what I mean. But I am just wondering. The word 'chaos' is a very unpleasant one. Everybody agrees that chaos must be avoided at all costs. But let's take the word 'freedom.' Everybody also agrees that that is a good

word. We all want freedom. And we more or less measure a civilization by its ability to retain the individual's freedom while preventing chaos. But aren't 'chaos' and 'freedom' almost synonymous? Aren't they the good and bad aspects of the same thing?

"In other words, when we say that some proposed action will either 'lead to chaos' or 'promote individual freedom,' aren't we pulling a semantic trick, and condemning or supporting the measure by the label we pin on it?" Tryg's voice had lost its drawl. It was earnest and sincere.

"I suppose you are right," Lan admitted. "But what has this got to do with the Administration?"

"Let's consider the Plan, instead of the Administration," Tryg said. "If I remember my sociology, the purpose of the Trade Control Plan is to correct, and keep corrected, certain specific conditions. Before it was adopted, many worlds were extremely poor. And some of these had fairly wealthy neighbors. One of two things usually happened. Either the rich ones took over the poor ones as empires, or the poor worlds ganged up on the rich ones—as a matter of fact, they had to. The wealthy ones were afraid of the poor worlds—afraid of their jealousy and of their envy. A prosperous world had to take over its neighbors as a simple matter of self-protection.

"On the other side, the poorer worlds had to destroy their more powerful neighbors to keep from being

taken over—namely for *their* self-protection. It was a vicious cycle of fear, aggravated continually by the uneasy consciences of the richer worlds, and the bitter frustration of the poorer ones. The result was the Chain of Wars. An epoch in which, at any given time, nearly all the worlds were fighting a war, struggling to recover from the previous one, or preparing for the next. It was, I think, a most unhappy time.

“The answer that was finally forced by the rising tide of blood and misery—to quote my history book—was the Trade Co-ordination Administration. It was based on the Plan of so regulating the trade between worlds that the poorer ones got the best possible break. The unlucky ones, then, had no reason to try to take over the richer ones. In fact, they had every reason not to. They were already getting the best break possible. The wealthy worlds, on the other hand, no longer had to fear their less lucky neighbors. And, in fact, they found that, although the dice were loaded in favor of the backward worlds, yet they still came off far better than they had in the old days when much of their prosperity had had to be invested in armaments.

“Anyway, this, in its briefest essence, is the Plan. And it has worked. With only a few very minor and local exceptions, war has ceased to be.”

“Let me remind you,” Lan cut in,

his voice dry, “that you were arguing that maybe we ought to dispense with the Administration. So far, you have put up a pretty good case for the opposite.”

“No, it only seems that way,” Tryg said. “The point I am making is that the main purpose of the Administration was to avoid war. It was war that made the period before the Plan one of ‘chaos’ and not of ‘freedom.’ It was to avoid war that the separate worlds agreed to restrict their separate freedom—agreeing to submerge their freedoms to trade with whom they pleased. But what I would suggest to you is that this purpose no longer has meaning.” The drawl was back in his voice.

“Eh? Why not?” Lan’s voice was alert. “We could wage some horrible wars with the physics we have now.”

“We could,” Tryg agreed, “providing we could find the enemy. If a world was threatened in the old days, the only thing it could do was to form coalitions and prepare to fight. But now we have the Subtronic Drive. And a world that is threatened need only put its Drive into stand-by condition. And then all it needs is two minutes warning of an impending attack and it can, if it wants, just not be there when the attack arrives. The Drive is the perfect escape mechanism.

“And if war, as I think, is now a practical impossibility, then, it seems to me, the sacrifice of freedom which

the Plan requires, and which is justified as an avoidance of chaos, is needless. The Plan itself is needless."

"That is interesting." There was an odd quality in Lan's voice. "Talk some more."

"All right, I'll go further," Tryg drawled. "It occurs to me that the present situation in which the Computer does not ever have the basic information it needs to do its job is not a reflection of the subconscious awareness through the Federation. The same type of argument is used as would be without the Plan. 'If I am threatened economically, then I'll move.' If the Plan were abolished you would have to make it 'economically *or militarily*,' but this is a minor change."

After a moment's silence, he continued: "I also think that may be the real reason why a man like Curlin is where he is. In the early days of the Plan, I don't think he would have got far. I don't think he could have fooled the people. But now—well, deep down maybe they don't care. Maybe they have a subconscious feeling that it doesn't really matter. I don't know, but I can't help wondering."

There was silence for a minute. Then Sita heard Tryg's voice: "Hey?" Then the door closed. She looked into the living room. Only her brother was there. She asked him: "Where did Lan go?"

"I don't know," he answered. "He just got up and walked out. I don't think I said anything to make him mad. I was just asking whether we really needed the Federation or not."

"Did he look mad?" she asked.

"N-no," Tryg said. "I wouldn't say so. Rather as if he were thinking hard."

"You must have given him an idea," she said. "Though I don't know what." She was thoughtful. "It may make sense, though. I didn't get a chance to tell you, but Curlin announced he was taking over. Going to force Lan's resignation at the Board meeting the day after tomorrow. Will put his own stooge in Lan's place. Curlin was quite open about it this afternoon. And open about how he would take over Thar as a result of this move. Lan says this will destroy the Federation, and I guess it will. He also says Curlin can do it, and that there is nothing he can do to stop it. And I guess that is right, too. But Lan does have some idea. What it is, or what he would hope to accomplish with it, I don't know and can't guess. But he has not yet decided whether to do it or not. Maybe your talk of being able to dispense with the Trade Control Administration ties in. Maybe it has given him a new viewpoint, and he has gone outside to study it in detail." Her voice was uneasy.

"I hope so," Tryg said. "I knew he was worrying about something. I was just talking, trying to give him some-

thing to think about besides his own troubles. I wouldn't want to make those troubles worse."

"You better not, boy!"

Tryg laughed. "That I know. You got a fine glib tongue, dear sister, but I know you too well, and the words you say don't fool me a bit."

"Do you blame me?" she asked. "If it were anybody else in this fight, I'd think he was worried about getting bounced from a good job. But Lan I don't think he's bothered a bit. He's concerned about the Federation. And, as far as I can see, that's all. I never met a guy like that before."

"There are not many of them," Tryg said. "He is worth going after, sis."

"I am," she said, simply. "Only I wish I knew how. I wish he would let me in on what he is thinking. What *can* he do? What is he meditating? All I know is that it is something that has to do with the fact that his title 'still commands respect.' "

"Publicity?" Tryg asked.

"Maybe," she said. "But how? Curlin's the fair-haired boy of the people. Lan would have to do something very drastic. Something like—" Her eyes widened in sudden horror.

"What is it?" Tryg's voice was like a knife.

Her tone was suddenly flat and lifeless. "Talking about rain checks, he said 'I hope I'll be able to use it some day.' " She looked around in sudden panic. "Oh, Tryg, we've got to go

after him!"

"No." Tryg caught her arm. "He has got to solve his problem himself. There is no other way."

"But maybe he's thinking of . . . considering . . . some gesture of some kind." There was incipient hysteria in her voice.

"Suicide?" Tryg was deliberately unemotional. "You are afraid he will commit suicide, trying to stop Curlin by the publicity it would bring?"

"Y-yes." The words sobbed. "Don't you see, it is the only thing he can do. It would be useless—futile. But it is all that's left for him to do."

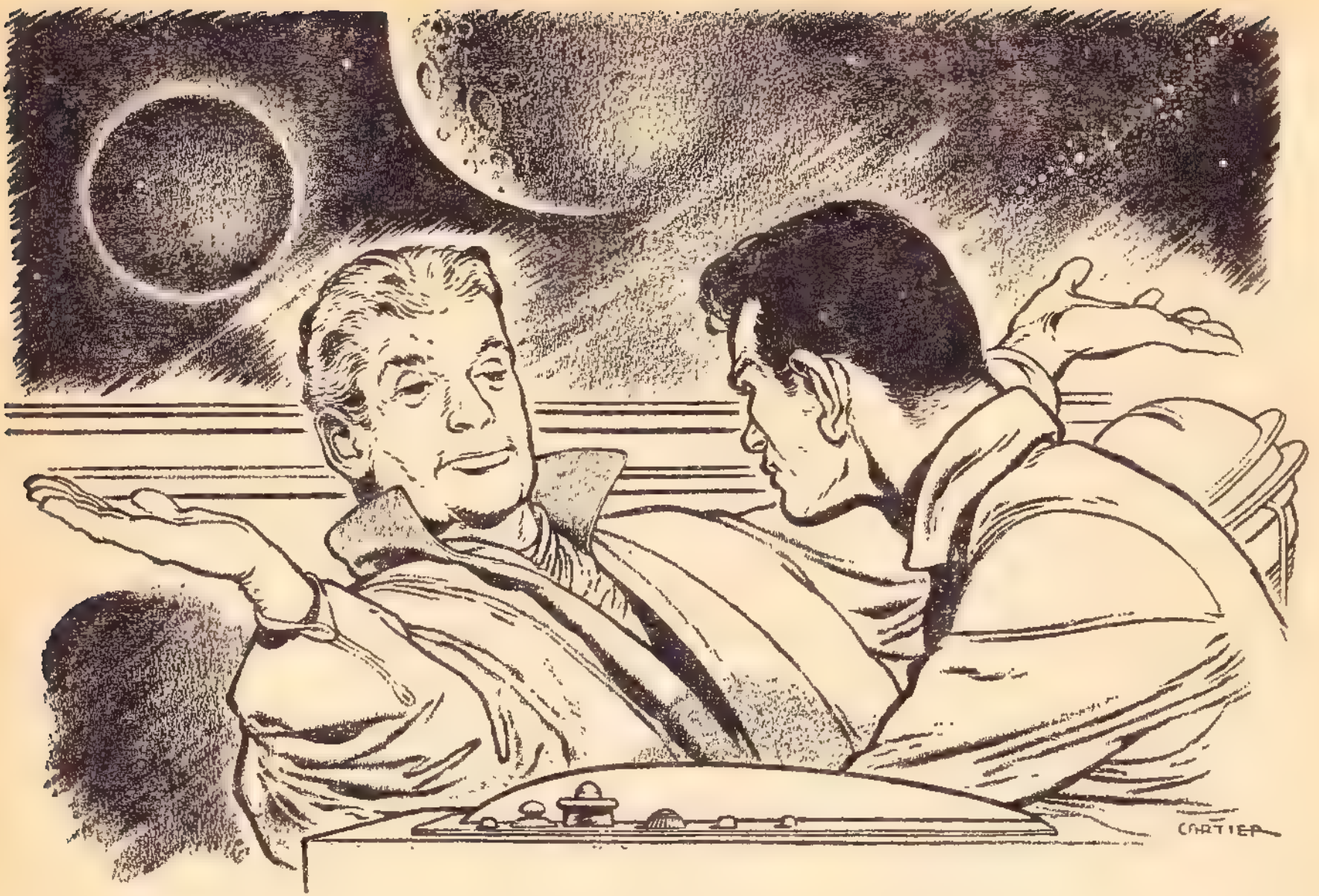
"Maybe," Tryg acknowledged. "And maybe it would not be completely useless. It might make people think. And that is what Curlin has most to fear."

"Oh, Tryg!"

"Well, it might. And there's no point in denying the fact."

"We've got to stop him, Tryg. We've got to."

"No," he answered. "In the first place, we can't. If he makes up his mind to it, not you nor anyone else can stop him. He is that kind. In the second place, our only hope is to let him figure it out for himself, coldly and logically, and pray that he decides against it. If we confuse him with an emotional appeal, I think it would probably make him go ahead with it. It is, after all, the dramatic solution. For a chap like him, the hardest thing is to accept defeat. Don't you see? It



won't be easy, but we've got to sweat it out."

She stared at him in blank horror. Slowly she crumpled. He caught her as she fell, and carried her to the couch. She lay there sobbing.

The next day, at the office, Sita was a wreck. Mechanically she went through the motions. She typed the final copies of the report of the Chief Mathematician to the Board. She sorted mail and answered the phone. She worked like a robot, blind, unthinking.

Tryg called up several times and dropped in personally twice. Each time she had to tell him she had heard

nothing. That she had not heard from Lan, and that neither had she heard of him. He tried to tell her there was hope in the fact they had not heard. She tried to believe it, but the thought oppressed her that, if Lan was going to try to stop Curlin by committing suicide with an appropriate accusing note, then the logical time to do it was while the Board was meeting. At least the fact of his suicide should hit the newscasts then.

He tried to tell her that suicide could not have been Lan's thought. After all, he, Tryg, had been arguing that Trade Control could be dispensed with, and this argument had obviously been tied in with what Lan had

been meditating. And how could that thought be tied to suicide?

"It is no good, Tryg," she said. "Look, suppose he does k-k . . . do it. And suppose it does work. Suppose it does stop Curlin. At the same time, it will weaken the faith of all the people in the Administration. His very success will undermine at least part of what he is fighting for. That's what he meant, I think, when he said he could not stop Curlin from wrecking the Plan. But you tell him Trade Control is not needed. This danger, then—that his action might itself destroy the Plan—is less important. It does tie in, Tryg. It does."

And Tryg could find no answer.

The second day, the day of the Board meeting, she was in worse shape. When the Board had assembled, they called her to ask where Lan was. She had to tell them she did not know. And then she collapsed. Tryg, fortunately, was there to stand guard while she wept.

It was, perhaps, a half hour later that the door opened. Sita did not stir. Her face stayed buried in her arms until she heard the disbelieving voice of Tryg cry out: "Lan!" Only then did she look up to see her missing boss standing in the doorway looking very pale and tired.

She gaped at him and stammered: "We . . . we . . . thought—" She could not finish.

"Then you guessed." Lan's voice

was gentle. "I'm sorry. I thought I had spared you that."

"But where have you been?" Tryg asked.

"Sitting in a park, meditating," Lan answered. "Most of the time, anyhow. Just now, of course, I've been to the Board meeting."

"The Board meeting?" Sita asked. "But they called about half an hour ago. To know where you were."

"Must have been just before I got there," he answered. "I was not there long. I gave them my resignation on the grounds of ill health. They argued politely but, as soon as they decently could, they accepted. All very polite but quick."

"Then you gave in?" Tryg asked. "Without even a token fight? I suppose you might as well. If you are going to lose anyway, cut your losses." He did not sound happy.

Lan smiled and winked. He beckoned them with his finger. "Come, children," he said. "We all need a drink. Let us discuss these matters in more congenial quarters. Besides, since my resignation was effective immediately, I no longer have any right to be here." He practically pushed them out the door.

When they were comfortably settled in a lonesome corner of a small tavern, Lan looked at each of them. "I did not dare talk in there," he said. "It is all too possible that that office is wired for sound."

"It is just as well," Sita said. "I am only just getting my breath. I was so sure you were going to make the gallant gesture."

Lan's mouth twisted, wryly. "You weren't alone," he said. "Yesterday I thought so too. And even Curlin would have agreed this morning."

"Curlin thought you would kill yourself?" she asked.

"Yes," he answered, "at least I think so. I think that may have been why he came to see me. At least that it was a risk he had anticipated. I think he thought he could weather the publicity by calling me insane. If so, then later troubles could be blamed on my insanity. If he could only get that idea across, then he would not need to worry ever. So I suspect he was perfectly willing to see me commit suicide."

"And yet you thought—? Or was this analysis of Curlin's motives an afterthought?" Sita asked.

"No, I thought that was what he had on his mind during the conference," Lan answered. "But I did not think he could weather it. Not entirely, at least. And anyway, there did not seem to be any other alternative that had any kind of a chance to be effective. At least this way offered a gamble." He dropped his head on his hands. His words were muffled. "You know, that's what hurt. The thought that I would never know whether the gamble had worked or not. If it hadn't been for that, I do not think it

would have been hard."

Tryg had been sitting back, smoking. He leaned forward. "If it will do you any good," he said, "I do not think your suicide would have beaten him. Curlin, whatever else he is, is a first-rank politician. And you are not. If he thought he could weather your suicide, then I would give heavy odds he could. So I do not think you should feel bad about not making the try."

"Feel bad?" Lan looked up, surprised. "I don't feel bad. Except worn out. Shaken up emotionally. But no more. Why should I?"

"Oh, I don't know." Tryg seemed a bit embarrassed. "I just thought you had the idea you should not have quit."

Lan, in his turn, looked suddenly embarrassed. "Uh—One thing I forgot to mention. I didn't quit. And Curlin, though he undoubtedly thinks so, has not won. In fact, I think he's lost."

"Eh?" Tryg's mouth was open.

"Don't look so surprised," Lan told him. "The credit actually belongs to you. You gave me the basis in what you were saying the other night—about the Plan not being needed any more. Also, its now being an infringement of liberty that is no longer justified. Remember?"

Tryg nodded. "Yes. I was maintaining that the justification of the Plan was to prevent the chaos of war. Only, now, any world that finds itself threatened with war can move. Providing, at least, it has the Drive and

the Generator. Which most of the worlds of the Federation now do. But what has that got to do with Curlin?"

"Plenty," Lan answered. "It took me a long time to see it. I didn't, at first. When I was listening to you, I just got the feeling that there was something there of tremendous importance. I left to get peace in which to try to figure out what it was. To let my thoughts crystallize. Only they didn't. I could not find the key at all. I sat in the park all that night and yesterday hunting for it. I just kept coming back to suicide as my only alternative to surrender.

"It is a funny thing, you know, the way the mind works. By yesterday afternoon, I was exhausted and frustrated. I had not found the barest gleam of the idea I had felt while listening to you. I had decided the whole thing had been a mental quirk. A delusion fostered by my own will to live. So, I made the final decision for suicide—and went to sleep.

"I woke up about ten last night. And the whole beautiful logic was clear before me. Each piece neatly fitted the puzzle. And all I could do was kick myself for having been so blind." He shook his head ruefully.

"Will you take us off the hook and tell us what this is all about," Tryg said, "or do I have to bash your head in?" Sita nodded emphatically.

"Well, let me ask you a question," Lan said. "Granted that the Plan is

now obsolete—that most worlds no longer need Trade Control—how would you go about canceling it? You would not just drop the whole thing. That would really throw the whole Federation into chaos—and I do mean chaos, not freedom, in spite of your semantic argument. But most worlds are not prepared to take over control of their own trade. And some worlds still need the Plan. And there are others that can still use it profitably.

"No, you would not simply drop the whole Plan. But you would, I think, let worlds back out of it as they wanted. You would give each the option of either staying in the Plan or of fending for itself. Wouldn't you?"

Tryg smiled. "Having answered your own question, go on."

"I'll ask you another question, then," Lan said. "And I'll answer this one, too. What would the effect of this be on the Computer? The correct answer is 'lovely.' The trouble with the Computer is that it does not know the topology with which it is dealing. Whenever a world moves, the Computer loses it for a while. And this confuses the Computer. If the price of a world staying in the Plan were that it must stay put, then the Computer would have no trouble dealing with the worlds in the Plan."

"The worlds of the Plan would be forbidden to trade with those outside?" Tryg asked.

"No," the mathematician answered.

"The worlds outside would be presumed to be unpredictable factors. They would be comparable in the type of effect they would have to know new inventions, or any of the other unpredictable factors. The Computer can adjust to bonanzas and disasters. It would be able to adjust to trade with the free worlds."

"I suppose so," Tryg nodded. "I'll take your word for it. Get back to Curlin."

"Well, suppose I could make this change over night," Lan said. "What would that do to Curlin's plans? Supposing he suddenly found himself with a Computer that worked? I don't know, but I think he would find it very hard to operate. I think he needs a Computer that doesn't work."

"Besides, as you said—and I think you are probably right—the reason Curlin is where he is is that the people, having lost faith in the Computer, have also lost interest in it. If the Computer started working again, I think they might get interested again. And that would certainly be disastrous to Curlin."

"Furthermore—and this, to me, is the cream of the jest—suppose nobody knew why the Computer was working. And suppose it was giving some very weird answers to certain unimportant questions. I think this will challenge the people. And I think it will throw Curlin completely off base. Maybe he will even try to explain what is happening—and end up making a com-

plete fool of himself. I am hoping so, anyway."

"Your supposings seem to have turned into facts," Tryg observed. "Only, of course, they obviously can't be. You would have to change the Prime Directive and that takes about fifteen years minimum."

Lan chuckled. "That statement is not quite correct. Remember how the Administration is organized. The Prime Directive is the basic authority. It can be changed only by a two-thirds vote of all the worlds of the Federation. Which, as you say, takes a good many years. But the Directive is written in words. And words have to be interpreted. They have to be defined, and the relations between them given the proper sense. And this is one of the most important functions of the Chief Mathematician and of the Board. It is a function that is not often used any more. Things have got pretty well stabilized. But it is still there. And it is still important."

"I don't understand," Tryg cut in, "why is it so important?"

"Take the last time it was used," Lan said. "When the Drive was first used—on Dorik, I believe—everything came to a screaming halt. The Computer did not give some bad answers as it sometimes does now; it gave no answers. The Prime Directive says that any solution must be such that the poorest world under it must be better off than it would be under

any other solution. It also says that all the worlds that exist that are inhabited by humans are in the Federation. So Dorik, since it still existed, was still in the Federation. And since it was getting no trade—since nobody knew where it was—it was obviously in a bad way. But, since nobody knew where it was, the Computer could not decide whether a given solution was better or worse than another. It could not pick a solution. It stopped.

“That particular crisis was handled by juggling the definition of the word ‘solution.’ Where, before, each order had been a separate solution, now the word was made to mean the general trade pattern. With this change, the Computer started working again. Not well, perhaps. It continued to order shipments to where Dorik had been, even though it wasn’t there any more, because that had been in the pattern before Dorik moved. But, at least it worked. And when Dorik was finally found, then the Computer was able to get a new complete integration—and establish a new ‘solution.’”

“I see,” Tryg said. “I guess it does have possibilities, at that. So what?”

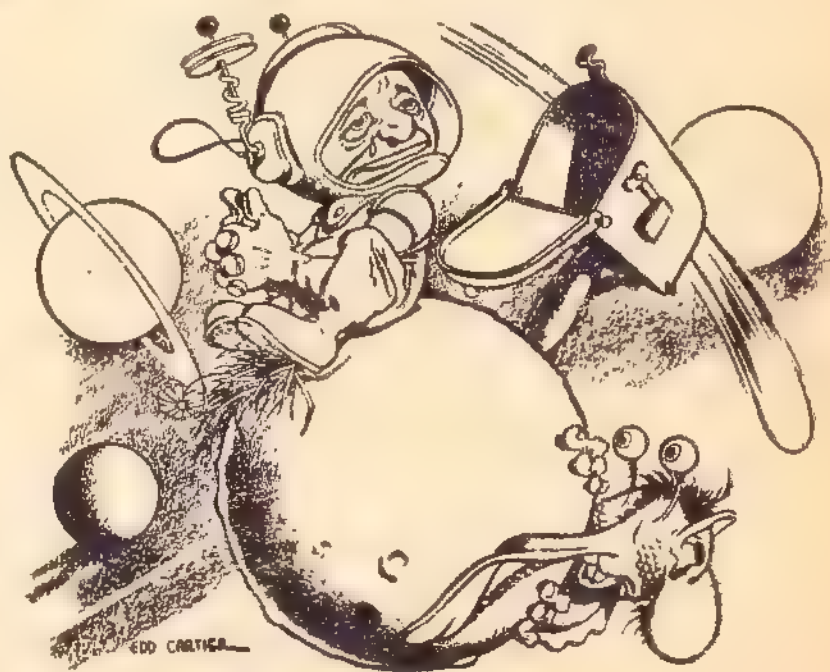
“So,” Lan said, “consider the statement in the Prime Directive that the ‘Federation consists of all the worlds that exist that are inhabited by humans.’ This is a statement of identity. It equates the term ‘being a member of the Federation’ with the term ‘being a world that exists that is inhabited by humans.’ It is a bilateral

relationship.

“Up to now, that statement has been used to define the Federation. But, last night, after I had awakened in the park with all the pieces put together, I sneaked into my office and turned it around. That control board, there, you know, can do almost anything that is legal.” He looked very smug.

“I don’t see what this does,” Tryg said, frowning in concentration.

“It modifies the Plan, for one thing,” Lan answered. “As far as the Computer is concerned, the Federation is now defined by its topology. As soon as a world moves out of that to-



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pology it will, for the Computer, 'cease to exist.' This, in fact, will be the Computer's answer to the question of where a world is that has moved. This answer will appear a little ridiculous when this 'world that doesn't exist' starts trading with other worlds in its new location. And this, I hope, is what will drive Curlin bats."

Tryg sat meditating for a few moments. "I think I see," he finally said. "By defining 'existence' in terms of 'the Federation,' stead of the other way around, and leaving the Federation to be defined by its topology, you have set it up so the Computer will count out any world that uses its Drive. Since these worlds are, generally, the prosperous ones, they won't suffer. And the poor worlds will still have the benefit of the Trade Control Administration. In fact, they will have more benefit than they do now, because the Computer will work properly."

"Curlin will be stymied by the fact that the Computer works leaving him no muddy waters. In fact, his past record, which is there for the digging, is apt to blow back in his face as the people get interested in the Plan again. And to stimulate this renaissance of the people's attention, there will be the puzzle of why the Computer insists that worlds do not exist that obviously do."

"Precisely," Lan nodded.

Tryg and Sita sat meditating a few moments. Then Tryg started to chuckle. Soon Sita joined him, and the two soon found themselves roaring uncontrollably. The few customers in the tavern turned to look, but Lan just sat there quietly smiling. Finally Sita stopped long enough to gasp: "You did it, Lan. You really did it." Tryg could only nod violently.

It was some minutes later, after they had control of themselves, that Lan turned to Tryg and said: "As I see it, you now have two alternatives. I don't want to seem ungrateful. I do acknowledge that it was you that gave me the clue to the solution. But, in spite of this debt I owe you, there are other factors to be considered. It is because of these other factors that I feel that you must either go home—or, at least, go—or find yourself a girl. I have a rain check, you see—with Sita. And, to be perfectly frank, you will not be welcome on that rain check—not by your lonesome. I suspect, you see, that I have been neglecting my opportunities." His hand moved on top of Sita's. She turned hers over. "And now that I am unemployed," he continued, his voice soft, "I have both the time and the inclination to make amends." He turned and smiled at Sita, and it was a very nice smile.

Tryg chuckled but said nothing. He just got up and walked out the door.

THE END



THE REFERENCE LIBRARY

BY P. SCHUYLER MILLER

READERS' CHOICE

Three years ago, in his then quarterly magazine *The Arkham Sampler*, August Derleth published the results of a poll he had taken among writers, editors, and readers of science fiction who had been asked to nominate twenty—or fewer—books “essential in any basic library of science fiction,” and to defend their choices. The participants, taking them alphabetically, were Forrest J. Ackerman; Everett Bleiler; Dr. David H. Keller; Sam Merwin, Jr.; Sam Moskowitz; Paul L. Payne; Lewis Padgett; A. Langley Searles; Theodore Sturgeon; A. E.

van Vogt; Donald Wandrei; and your reviewer.

The selections were highly varied and highly individual, as might be expected. No book was on more than nine lists. Seventeen had three or more votes, and below that the choices were legion. All of the participants, as will be seen, drew heavily on specific editions in order to cover more ground with their twenty-book limit. The “basic” library was: “Seven Famous Novels,” by H. G. Wells (9 listings). “Last and First Men,” by Olaf Stapledon and “Brave New World,” by Aldous Huxley (7 each). “The Short Stories of H. G. Wells”; “Adventures

in Time and Space," edited by R. J. Healy and J. F. McComas; and "Slan," by A. E. van Vogt (6). "The World Below," by S. Fowler Wright and "Strange Ports of Call," edited by August Derleth (5). "To Walk the Night," by William Sloane; "The Lost World," by Sir Arthur Conan Doyle; "Sirius," by Olaf Stapledon; and "Gladiator," by Philip Wylie (4). "Before the Dawn," by John Taine; "Who Goes There," by John W. Campbell, Jr.; "Star Maker," by Olaf Stapledon; "The Best of Science Fiction," edited by Groff Conklin; and "Out of the Silence," by Earle Cox.

One confusion of purpose was immediately evident to anyone trying to make a twenty-book selection, and to anyone reading the jury's comments. Nearly everyone tried to reach some compromise between two types of "basic" science fiction library: one which would incorporate the landmarks in the development of present-day science fiction—e.g. Verne, Wells, "Erewhon," "Frankenstein"—and one which would consist of the twenty "best" books by modern standards—most interesting in theme, best written, or what have you. Some books very obviously met both sets of standards: Wells got in the final seventeen but Verne didn't; Stapledon rather overbalances it. In 1949 the spate of anthologies was just beginning, and all three of the latest got in; today there would be a very interesting problem in choosing among the dozens

of collections we now have, the one or two which you believe best represent modern short science fiction.

I say "would," but the purpose of bringing up August Derleth's poll is to suggest that we make it "will." Will you, the readers of Astounding SCIENCE FICTION, as judges of good reading, nominate your own choices for a "basic" science-fiction library? It might even be called "*The Reference Library*"—except that we need two of them.

One is the library of twenty-five books which best illustrate the growth of science fiction, from whatever roots you choose—Plato? Lucian?—down to the most recent book which you consider a landmark in the history of the *genre* or representative of its present state. This is the collection you'd recommend to a scholarly friend who has heard about science fiction and wants to know what it is and how it came about. It's Derleth's "Beyond Time and Space" developed in book-sized units instead of short stories and novelettes. I don't know why some smart character shouldn't be able to do a Master's thesis in Literature by justifying his choices. Doctorate, even, if you're erudite enough.

The second library is the list of twenty-five books which you'd keep if your present collection—including whatever you'd like to have and don't—were cut back to that number. This is the list you recommend to someone who needs to be shown that science

fiction is as enjoyable, as entertaining, and probably more stimulating than most comparable fields of writing. You'll have to draft your own criteria here. You may want books which represent all the different types of science fiction, from space opera and Edgar Rice Burroughs down to Stapledon, Gerald Heard, and "Null-A." You may want all thud-and-blunder; you may want all social satire; you may want BEM's and bims. Or you may want just twenty-five darn good books that you've read many times and would like to read many more.

Send me one list or the other, or both, but *please* don't mix them up or we'll be right back in the tangle Derleth's stable of experts was in three years ago. And I *do* mean books—hard-shelled ones—not some "classic" serial you've heard about. "The Blind Spot" wasn't eligible in 1949, nor was "Seeds of Life"—they are now.

About the time limit: you'll find this issue on the stands about the middle of May, but let's say June 1st, since it's the June issue. Three months should be enough for anyone to make up his mind about a thing like this, so let's say that I have to have your letters by September 1st. Mail them as you prefer, to the magazine or to me directly at my home, 306 Riverside Avenue, Scotia, New York. This means I'll have the tally completed and the two libraries ready for a report in the January issue.

This is strictly up to you. No nom-

inations—no report next January, and I'll give you the address of a good bookseller who can get you the Winter, 1949 *Arkham Sampler* with the full returns in August Derleth's poll, since our own fizzled out. But if we get a good response, I think we should report the results to the *Library Journal* or its equivalent, and get the public libraries of the country busy stocking their shelves with the books the real experts—the readers—choose as the best of the best.

Readers' choice is probably the best term for another venture of which many of you will have heard through other channels before this reaches you. Lloyd Arthur Eshbach, fan-writer-editor-bookseller-publisher of Reading, Pennsylvania, has just announced a new venture in rarity to be known as the Polaris Fantasy Library.

Eshbach intends to dig through the nooks and crannies of some of the country's biggest science-fiction collections for the legendary "classics" of which we were talking last month—novels, either fantasy or science fiction, which stood out in their day and are still good reading. These, his new Polaris Press, 120 N. Ninth Street, Reading, Pennsylvania, will bring out in numbered, limited editions of fifteen hundred copies at \$3.00 a volume, on the best book paper, in the good bindings you've learned to expect from Reading.

The titles in the Polaris Library are

going to be selected by fans, for fans. Fan No. 1 is, of course, Lloyd Eshbach himself—his is the job of hunting and finding. No. 2 is Oswald Train of Philadelphia, a member of Prime Press whose own series of reprints of utopian Americana we're going to discuss some day soon. No. 3 is a younger member of the clan, Norman F. Stanley of Rockland, Maine, and No. 4 will be Darrell Richardson of Covington, Kentucky, who owns one of the biggest collections of science fiction and fantasy anywhere in these United States. No. 5 of the present panel is yours truly, of Scotia, New York. There will probably be others as the project picks up speed: the eventual plan is to have each new book selected from a list of nominations by at least three judges out of the group.

Polaris Choice No. 1 comes from the files of Street and Smith's pioneering adventure in science fiction and fantasy, the legendary *Thrill Book* which lived and died years before *Amazing Stories* or even *Weird Tales*. It is "The Heads of Cerberus," by "Francis Stevens," in herself a mystery on which Lloyd will be able to cast some revealing light in his special introduction. As one of the judges, I read photostats of the original 1919 serial obtained from the Library of Congress. There is a touch of the fantasy which led some readers of the day to take "Stevens" to be a *nom de plume* for A. Merritt—but the rest is a political and social satire of graft-ridden

Philadelphia extrapolated to the year 2118, which reads much like J. A. Mitchell's "Last American." And both Norman Stanley and I agree that here is a first use of the parallel time-worlds theme, with a special twist.

Polaris No. 2 will be "The Abyss of Wonders," by Perley Poore Sheehan, from *Argosy* of 1915. The judges haven't gone any farther yet, though other rare titles are in mind. Whether Polaris goes any farther at all will depend on the response to the first two books. Write to Polaris Press for a prospectus: it costs only a two-cent postal card. Remember—this is a subscription venture. You won't be able to get Polaris books through a bookstore.

From classics of the past we move to would-be classics of the future. As mentioned before, Shasta Publishers—whom we have to thank for Campbell's "Who Goes There!", the Heinlein "future history" series, and a good deal more—have joined forces with Pocket Books to launch a nation-wide competition for original science-fiction novels. Preferred length: 60,000 to 100,000 words. Theme: the less stereotyped the better, though I'll bet a good enough writer could take the grand prize with a story of the first trip to the moon. That prize, incidentally, will be \$4,000 with a number of additional \$2,500 awards to runners-up while the running is good. You have until September 30, 1952—

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| Automatic Computing Machinery: | Readable Writing | Mathematical Statistics |
| Programming and Numerical Computing | Mathematics Refreshers | Probability |
| Automatic Computing Machinery: | Elementary Algebra | Differential Equations |
| Construction and Design | Higher Algebra | Calculus of Finite Differences |
| Cybernetics | Geometry | Topics in Modern Mathematics |
| Construction of Small Robots | Trigonometry | |

Write for folder: EDMUND C. BERKELEY and Associates
(makers of SIMON, the Mechanical Brain, and SQUEE, the Robot Squirrel—see covers and articles Oct. 1950 and Dec. 1951 *Radio Electronics*—Berkeley is author of *Giant Brains or Machines that Think*, Wiley, 1949, and *Machine Intelligence in Astounding Science Fiction* Jan. 1952)

19 Milk St., R29, Boston 9, Mass.

the deadline has just been extended—to deliver your manuscript to Shasta Publishers, 5525 S. Blackstone Avenue, Chicago 37, Illinois. Everett F. Bleiler and T. E. Dikty, editors of the annual “Best Science-Fiction Stories,” are the judges, so you know how high the standards will be. Shasta’s trade edition of the winner is to be followed eventually by a paper-bound Pocket Book edition of several hundred thousand copies.

Remember when we said the best sign among current trends was the move toward new, previously unpublished stories—both novels and shorts? Here’s assurance that the trend will continue.

Back to the historians’ angle now, for a moment. In the February “Library” I announced the forthcoming “Index to the Science-Fiction Magazines: 1926–1950,” to be published in April by Perri Press of Box 5007, Portland 13, Oregon. By this time the book will be out: prepublication price was \$5.00 if you heeded the first warning, and is \$6.50 since publication date. Forty-eight magazines and one thousand two hundred fifty issues have been conned by Donald B. Day, whose personal project this is. *Weird Tales* and a few purely fantasy magazines seem to be the only omissions—but *Unknown* is in. You get double indexing, by author and title—bibli-

ographical information on the magazines themselves—and verified pseudonyms: over twenty thousand entries—offset printed and buckram bound. “Indispensable,” Day’s folder says: could be he’s right, if you have a big magazine collection, or if you’re buying back numbers and want to be sure of getting a certain story or an author complete. Prediction: Perri Press is going to have to get to work on another book covering the Munsey magazines, *Thrill Book*, and the other magazines *before* 1926.

News Note: New York *Times* reports that William J. Hampton, 1102 Baldwin Avenue, Ann Arbor, Michigan has produced and will rent a feature-length—seventy-four minutes—film of Franz Kafka’s “Metamorphosis”—see Fletcher Pratt’s collection, “World of Wonder.” This is the story of the man who turned into a five-foot cockroach. It was produced by the Gothic Films Society of the University of Michigan, which we can hope will go further in the field. The film is rentable from Mr. Hampton at the address given: fan clubs and conventions please note.

GRAY LENS MAN, by Edward E. Smith, Ph.D. Fantasy Press, Reading, Pa. 1951. 306 p. \$3.00

A full-length portrait by Rogers of that hard, hard character, Gray Lensman Kim Kinnison, standing at the air lock of his speedster with a Dela-

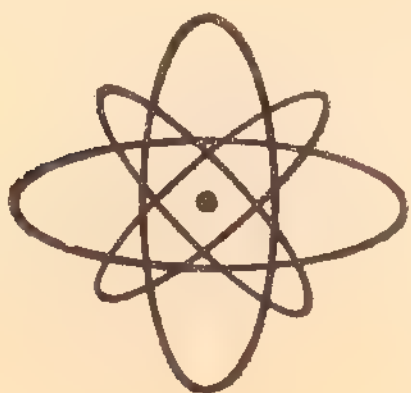
meter at each hand and his Lens radiating to all Space, introduces this climactic volume in the Lensman series. It is hard to believe that the yarn was serialized here as far back as 1939—which makes it a “classic” by the arbitrary definition we set up not long ago. And classic it is, for in this—the second episode in the original series and fourth in the revised saga—Kinnison came of age and took on Space, Time, and some odd corners between.

Doc Smith, as is his custom, has done a good deal of work on the story, fattening it, tying up loose ends, and making certain that it fits the Arisia-Eddore conflict of good and evil which lies at the root of the entire series. This time, instead of employing the rather unwieldy asides which he inserted in “Triplanetary” to make it the first of the saga, he has supplied an introductory synopsis of the sort that would be handy to neophytes who invade the Metropolitan halfway through the Wagnerian “Ring.” But who is a neophyte in the Lensman cycle?

In this story Kim Kinnison is on stage practically 99.999 per cent of the time—to steal a Smithian phrase. He takes on as many disguises as Cleek of the Forty Faces, or John Barrymore playing Arsene Lupin. He sizes up Boskone, runs its chain of command back to a neighboring galaxy from which he kidnaps a friendly but harassed planet, single-handed—well, almost—mops up the Boskonian drug empire, and eventu-

ally gets himself even more thoroughly macerated than in his tussle with the wheelmen of Aldebaran I. Fortunately red-headed Chris MacDougall is at hand to reassemble him, and this time he does not stride modestly off through space—for isn't the next and last of the series entitled "Children of the Lens"?

Nobody has ever satisfactorily explained the charm and swing of Doc Smith's unabashed space-opera. With a half-hearted bow to Edmond Hamilton, who did begin flinging stars around somewhat sooner, he practically invented space-opera in its each and every element. Incredible heroes, unbelievable weapons, insurmountable obstacles, inconceivable science, omnipotent villains, and unimaginable cataclysms—they're all there, doubled and redoubled, in natural canastas, royal straight flushes, grand slams, or whatever you prefer. Whatever his yarns have, "Gray Lensman" has more of, in greater abundance and variety, than any of the rest. Who can say more?



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- A space pilot starts out as a new Noah, to escape a tragedy greater than the flood.

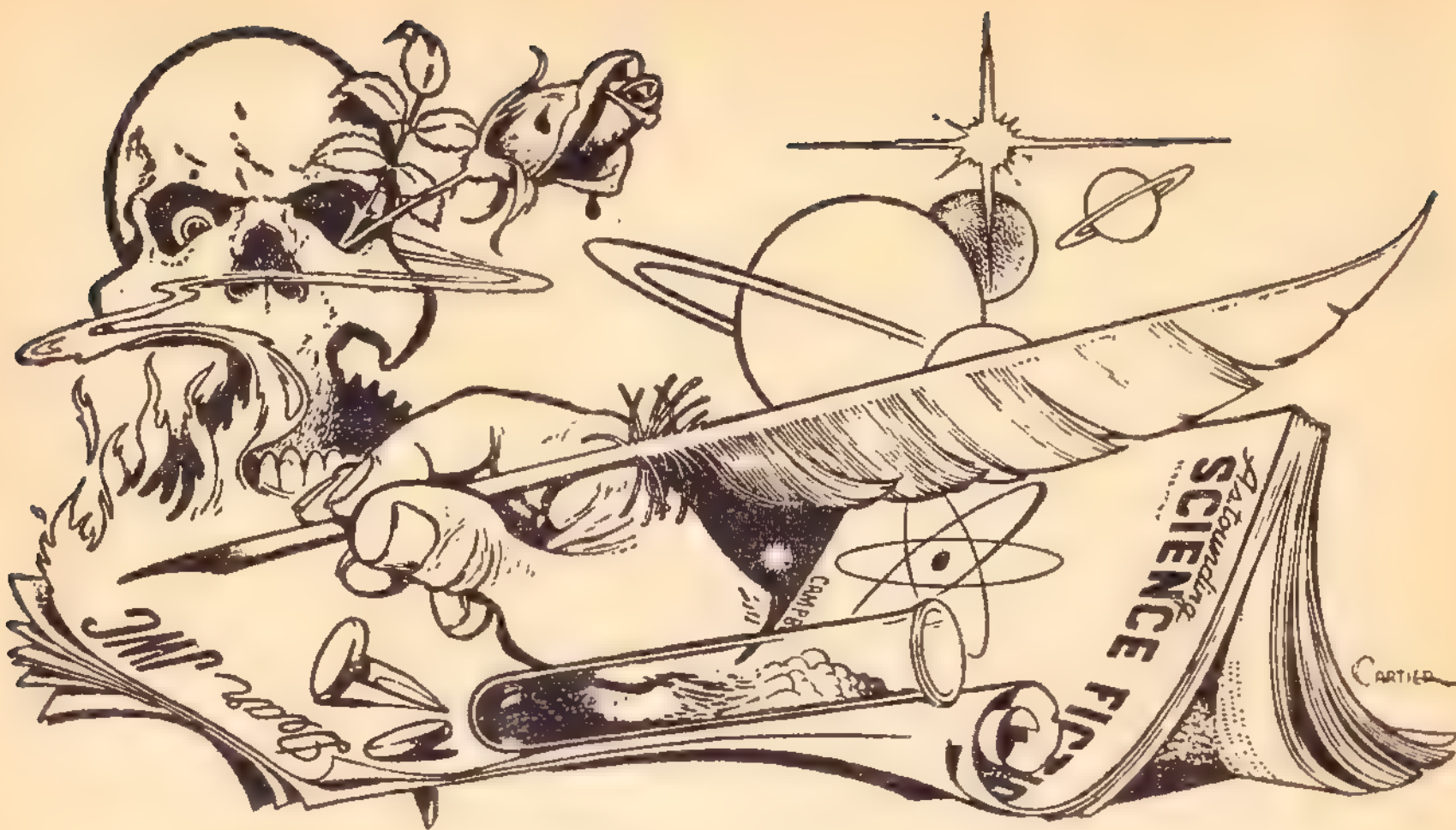
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BRASS TACKS

Dear Mr. Campbell:

It seems to me that the subject of mechanized "thinking" may not have been settled conclusively by Mr. Berkeley's article, "Machine Intelligence." At any rate, I should like to chance a few remarks on the matter, in an effort to detach emphasis from the question, "Do machines 'think,' or not?" and to look instead at what actually goes on inside of a modern computing device.

Let's take a digital machine in which the computing is done by ordinary electrical relays, as a starter—such as the Aiken Relay Calculator (Mark II) or any of the Bell Labs'

machines—and lift up the lid. Inside we observe a large number of relays connected with scores of wires, and are aware of the more or less continuous clicking of the relay contacts dropping in and out. In fact, before analyzing further, it would be very hard for us to tell the difference between this machine and a small automatic telephone exchange relay bay. Closer study would reveal—if we were exceptionally alert—that when certain combinations of relays showed particular contact configurations, other specific relays were operated, and so on; in other words, some relays were dependent upon others in definite ways. Finally,

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we would note that the "calculating" relays were dependent upon the input devices of the machine—keyboards and tapereaders—and in turn determined the behavior of output apparatus such as printers or tape perforators.

We wouldn't see information being transferred from one place to another, or addition being performed, or logical choices taking place; only the complicated equipment and its rather puzzling behavior are on display.

The point, of course, is that while the behavior of the pieces has significance for the user and the designer, who share a common point of view, this significance is probably not universal. Eventually we may realize that a closed relay contact stands for, say, a binary "one" and an open contact for a "zero," that the relay itself stands for a binary digit, and that a row of such relays represents a binary number. Then, when we see a second

row of relays assuming the exact contact arrangement held a short time before by the first row, we may indulge in a little shorthand and say "A number has been transferred from one place to another." But this shorthand should not be confused with what actually occurred: the appearance of a "token" (Reichenbach: "Elements of Symbolic Logic," Macmillan, page 4) in one place shortly after its occurrence at another place. The "tokens" are the actual contact configurations of particular relays, and the class of all similar tokens is a symbol, in this case a symbol representing a particular binary number.

While all this may seem belaboring the matter to insensibility, I think at least one novel idea pops up at this point: all machines and automatic information systems exhibit this same property, but the tokens occurring and vanishing—symbols being shipped

around—usually have significances different from those of the calculator. For example, the automatic system which turns the traffic lights on and off in a manner calculated to keep me below 10 m.p.h. on the way to work in the morning has the same kind of bits and pieces as the relay calculator; by enforced convention shared by the citizens of Boston—and of no place else, by rumor—its output symbols are interpreted somewhat differently. Again, many old houses have three-way light switches upstairs. A switch for the hall light at the front and back stairways, and a third somewhere in the hall itself, so connected that snapping any switch will change the state of the hall lamp: turn it on if it's off, off if it's on. Here we have a perfect "half-adder" as described in one of the original "EDVAC" reports, a device which, if regarded properly, will be seen to do addition modulo-two, adding three "binary numbers" without "carry." But ordinarily the symbols of the system are not interpreted that way by the inhabitants of these large houses and so the thinking robot in their midst carries on unnoticed. Who knows what the rest of the devices of our begadgeted civilization are up to? The pinball machines, the television transmitter sync pulse generators, the elevator position signaling systems, the automatic telephone exchanges?

I hope I have succeeded in suggesting the intimate way in which human beings are coupled to the "informa-

tion processing" devices they devise and construct, for this seems not to be emphasized by Ed Berkeley's article. There are a number of other facets of his discussion which I would like to comment upon, but perhaps the most intriguing of these is the implied proposition that people think mechanically, like machines (see the definition of "ideas" on page 93). It's hard to avoid the suspicion that this point of view cuts the ground from under its own feet: if people think like machines, then the statement "people think like machines" merely testifies to the mechanical excellence of the thinker making the statement, and is "true" in about the same sense that his blood pressure or alpha-rhythm is "true."—Theodore A. Kalin, 1481 Main Street, Waltham, Massachusetts.

And, of course, the usual oil-burner robot—and the automatic washing machine robot!

Dear Mr. Campbell:

I have just started reading the February issue of ASF and already I have found cause to write you a letter—and not once, but twice.

First of all, in your own editorial:

You say "A mechanism . . . , with value ranging from negative one to positive one—'never' to 'always'—could correct its own data." What I should like to know is how you are going to set up "most of the time" or

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"well, hardly ever" on your mechanism. Being a lover of Gilbert and Sullivan, I am naturally interested in finding out.

Also, supposing that there *is* a method of setting this sort of thing up on a binary-system mechanism that usually deals in simple yesses and noes, how are you going to evaluate what goes into the machine. In other words, whose correlating data-sets are you going to use? It would seem to me that the type of creative thinking the machine will do will in large part depend upon the type of creative thinking that the mind which supplies the data-sets does.

In a sense, the data-sets of each person determine his reaction, for instance, to the Rorschach Ink Blot Test, don't they? And there is undoubted significance about your own correlating data-sets, Mr. Campbell, in the fact that you chose cats and peacock

plumage as your example.

To put my thoughts into more positive and constructive form, I would suggest that the purpose of the machine must to a large part determine whose data-sets are used. Perhaps we might build a sort of super creative thinker by, say, getting all the worlds greatest physicists to contribute their data-sets to a machine designed to do creative thinking in theoretical physics.

But who should we ever get to supply the machines' data-sets in the field of government, sociology, politics, poetry, art, music, et cetera?

My second bone of contention:

In your comment anent de Camp's reply to Hubler in Brass Tacks, you say: "The physical scientist is blamed for the danger of atomic warfare—but it is the failure of social and mental sciences that makes atomic bombs a threat. The fact that an atomic bomb

exists does not mean you have to kill people with it. Whether it is so used is a social-mental, not a physical, problem."

Now, there are a great many things in this short statement that are worthy of comment. Primarily, your error stems from equating the atomic bomb with other weapons like the rifle and the pistol. It is not in the same category at all. A rifle has many uses other than military. It may be used for such useful purposes as hunting for food, shooting at old tin cans, et cetera. It doesn't have to be used to kill people with, any more than a knife or a hatchet does.

But an atomic bomb, along with block-busters, submarines, et cetera, are designed for one purpose only—to kill other people in a war. So a scientist who works on the development of the atomic bomb is as much a part of the direct killing of the people in Hiroshima as the bombardier who dropped it. It was being made for that one purpose, and no other. He is not in the same position as the man who manufactured or designed Lizzie Borden's hatchet.

I will agree with you that the problem of the atomic bomb is social-mental rather than physical. But it is the physicist as well as the general and the statesman who has the social-mental problem. And, until the social-mental sciences develop enough to

take care of such things by law, it is the individual social-mental responsibility of each citizen to determine what is right in such a case and what is wrong.

It seems to me that scientists have decided, by and large, that it is right to make atomic bombs. I hope none of them have the ostrich outlook on the matter that you suggest and are saying that they only make the bombs; what is done with them afterwards is no concern of theirs. There is only one thing that can be done with an atomic bomb, basically. I should hate to think that such a large part of the world's welfare was in the hands of men who were not aware what they were doing.—William Schallert.

1. *The "hardly ever" type function is simply a low-probability factor.*

The data-sets are necessarily your own and nobody else's. Not having telepathy, you have to make up your own data sets from evaluation of perceived physical data—sound waves, light waves, et cetera.

2. *The way to end war once and for all, as Churchill pointed out, is simple; if every soldier in the world will just recognize that he doesn't want to fight, and quit fighting, the problem of war will cease to exist. For some reason—problem for social-mental science—they don't. And until infantrymen stop, the technician can't.*

THE END

IT WAS A BRIGHT EARLY DECEMBER DAY and Lieutenant Hudner was flying a Korean combat mission alongside another plane piloted by Ensign Jesse Brown. A burst of flak caught the ensign's plane and he went spinning down, aflame. Lieutenant Hudner then deliberately crash landed near his flame-trapped shipmate. He radioed for help, after which he fought to keep the fire away from the fatally injured ensign until a rescue helicopter arrived. Today Lieutenant Hudner says:

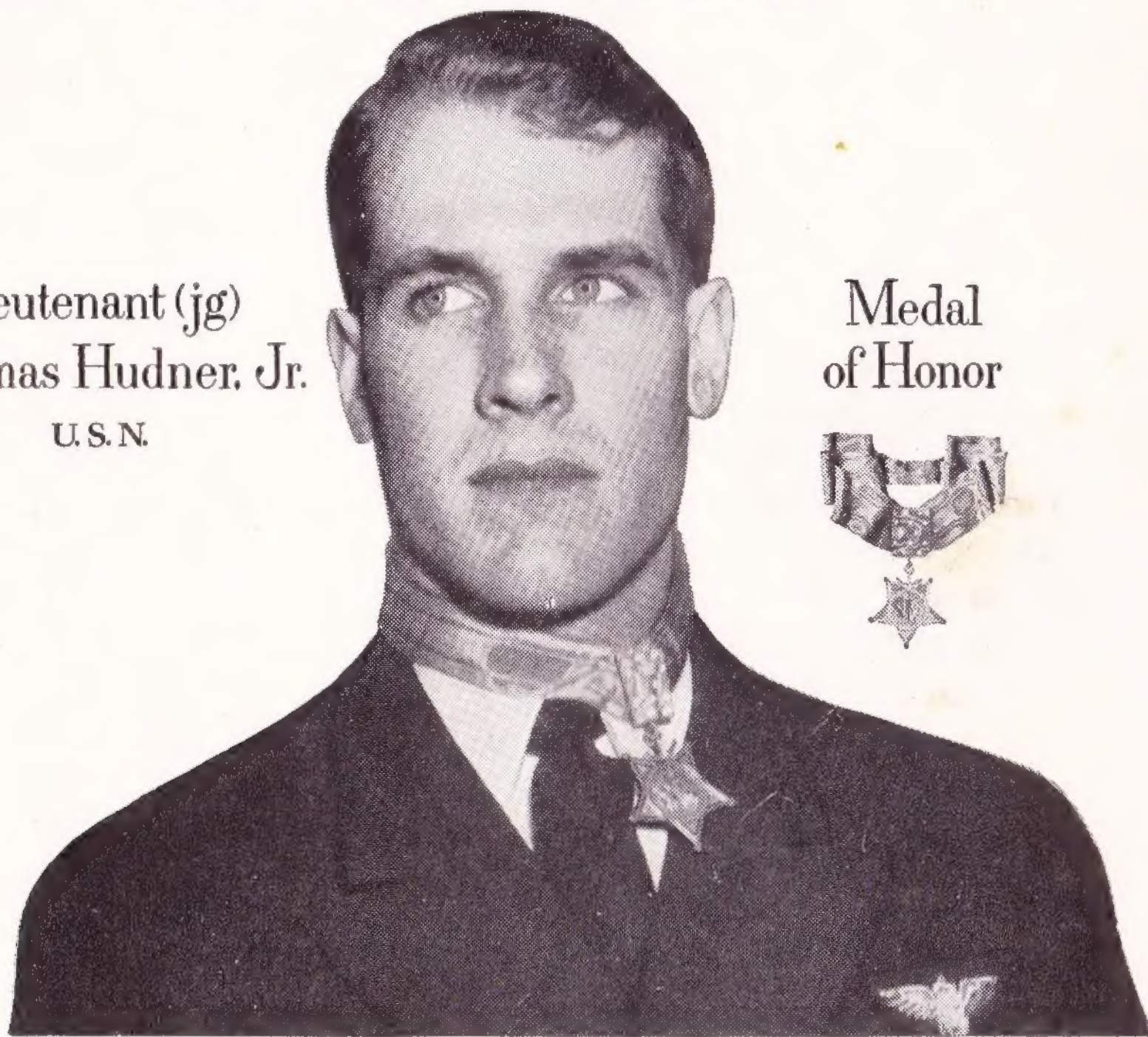
"Maybe if America had been strong enough to discourage aggression two years ago, my friend, Jesse Brown, might be alive right now. So might thousands more of our Korea dead.

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Lieutenant (jg)
Thomas Hudner, Jr.
U.S.N.



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